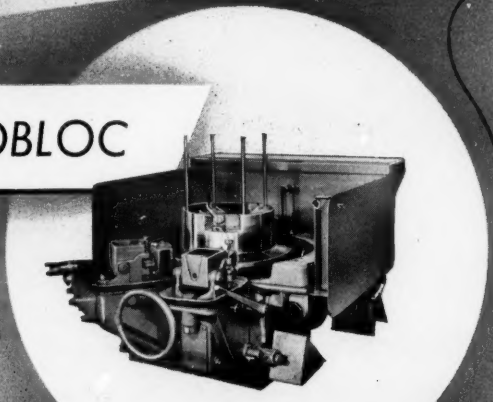
WIRE AND WIRE PRODUCTS

APRIL 1947

MOTOBLOX



MOTOBLOC

YOU SET THE PACE...

THEY will maintain it!

The speed, flexibility and versatility of Vaughn Motobloc and Motoblox are your assurance of dependably-sustained performance at every production pace. Let us show you how these values can serve your operations this year, and for years to come, with better efficiency and economy.

THE VAUGHN MACHINERY COMPANY
Cuyahoga Falls, Ohio, U.S.A.

VAUGHN-MACHINERY

PROFITABLY USED BY LEADING WIRE MILLS SINCE 1860...

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Four WILSON Wire ANNEALING FURNACES AT REYNOLDS WIRE CO. SET NEW PRODUCTION LEVELS

In 1946 the Reynolds Wire Co. of Dixon, Illinois, prepared for the postwar market by expanding their Wilson wire annealing installation to four furnaces and twelve bases.

A recording temperature instrument for every base provides quality control by providing a complete temperature cycle record for every charge of wire annealed.

ENGINEERED AND CONSTRUCTED BY THE

Lee Wilson ENGINEERING Co., Inc.

20005 West Lake Road CLEVELAND, OHIO

Telephone ACademy 4670

UPRIGHT ★ ★ ★

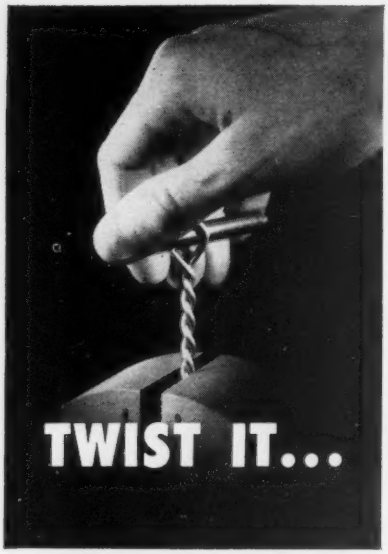
★ ★ ★ CONE

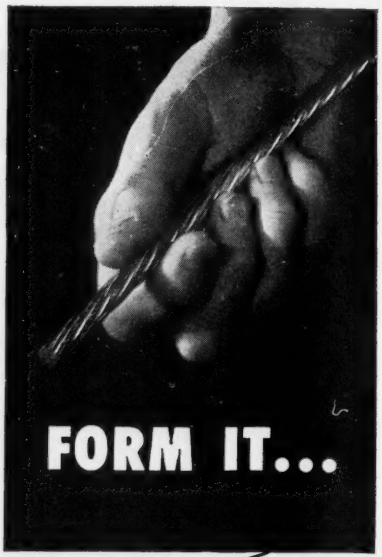
Wire Drawing Machines

FOUNDED WATERBURY FARREL 1851

THESE high speed machines are available in several sizes and can be had with either a coiling block or spooler. The spooler may be an attachment or a separate floor-type device, such as shown. This is the No. 4 machine with belt-type cradle spooler. It is driven by a direct-coupled motor (not shown), has 13 dies and capacity for drawing copper from ¼" maximum starting size down to a finishing size of from No. 10 to No. 18 B. & S. gage. The dies and the hardened steel drawing rolls are enclosed by a rolling steel curtain to confine the splash of the drawing lubricant.

WATERBURY-FARREL
FOUNDRY & MACHINE COMPANY
Waterbury, Connecticut, U. S. A.
SALES OFFICES: CHICAGO CLEVELAND NEWARK, N. J.





YES, EVEN DRAW IT AND THE *Zinc coating stays put*

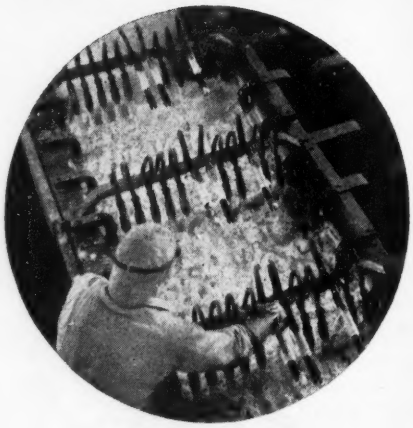
You're right! That's not ordinary wire—it's bethanized wire. That pure zinc coating, deposited evenly by an advanced electrolytic process, is perfectly bonded to the steel. Give this unique wire any torture treatment you wish, and you won't find any flaking or peeling of that ductile zinc coating.

Naturally, it's highly resistant to corrosion. The protective coating is so pure, so uniform, that rust is locked out at every point on the surface. And whenever extra protection against corrosion is required, bethanized coatings can be supplied in weights up to three times as heavy as those called for in conventional Type 3 galvanizing.

Does bethanized's double feature of Ductility and Corrosion-Resistance sound too good to be true? Test it! Pick a tough job, and give bethanized wire a tryout. We've said many times that it's good—but not nearly so often as those who use it.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

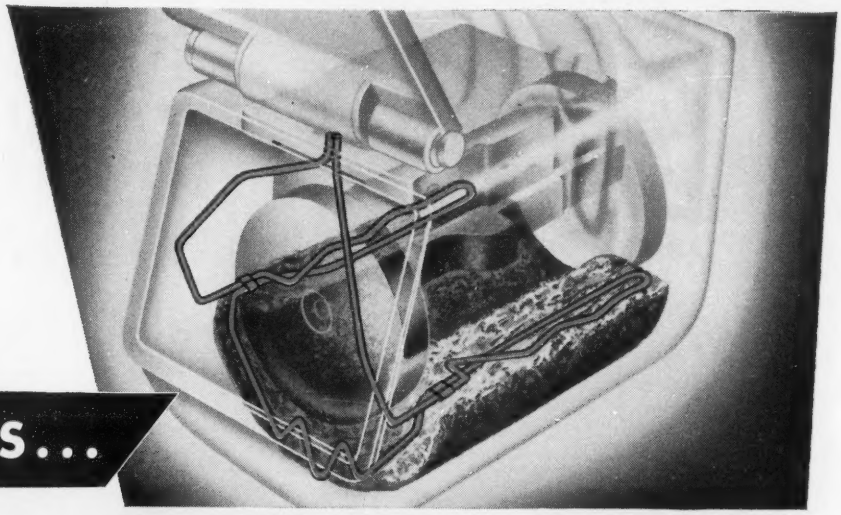


This is a close-up view of the electrolytic cell through which the wire travels. Virgin zinc is electrolyzed from the highly purified bethanizing solution and deposited on the wire surface, perfectly bonded to the steel.

★ Bethanized Wire ★

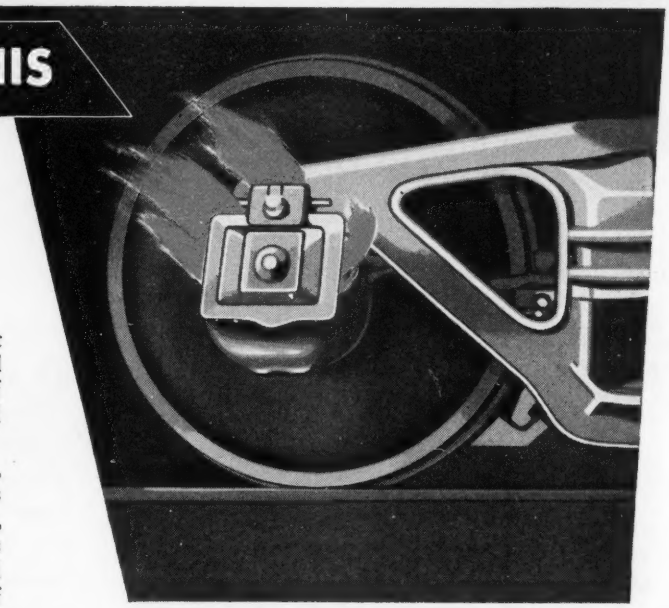
BETHLEHEM STEEL

WIRE & WIRE PRODUCTS, Vol. 22, No. 4, April, 1947, Publication Office, at 61 Cliff St., New York 7, N. Y. Executive Office, 100 Main St., Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secy. and Treas. Subscription price: U. S., $5.00; Canada, $5.00 per year; 50 cents per copy; Foreign, $7.50 per year. Entered as second class matter, June 14, 1946, at the Post Office, New York, N. Y., under Act of March 3, 1879.



THIS...

Helps prevent THIS



Another important application of steel spring wire

One of the headaches of railroading is "hot boxes" . . . caused by failure of journal lubrication. And one of the principal causes of lubrication failure is displaced packing and waste grabs.

Our customer, Spring Packing Corporation, Chicago, Illinois, has successfully solved this problem by developing a packing retainer, fabricated at low cost from one of the thousands of types of steel wire made by American Steel and Wire Company. More than two million of these retainers are now speeding service and avoiding lubrication troubles on 75 railroads.

Not only in railroading, but in hundreds of other industries, products made of American steel wire are doing important jobs . . . wire forms, springs, reinforcements, stiffeners, framing, to name just a few. Our engineers are always ready to consult with manufacturers in the design and fabrication of such products. Simply write to American Steel and Wire Company, 412 Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago, New York
COLUMBIA STEEL COMPANY
San Francisco
Tennessee Coal, Iron & Railroad Company, Birmingham, Southern Distributors
United States Steel Export Company, New York
UNITED STATES STEEL

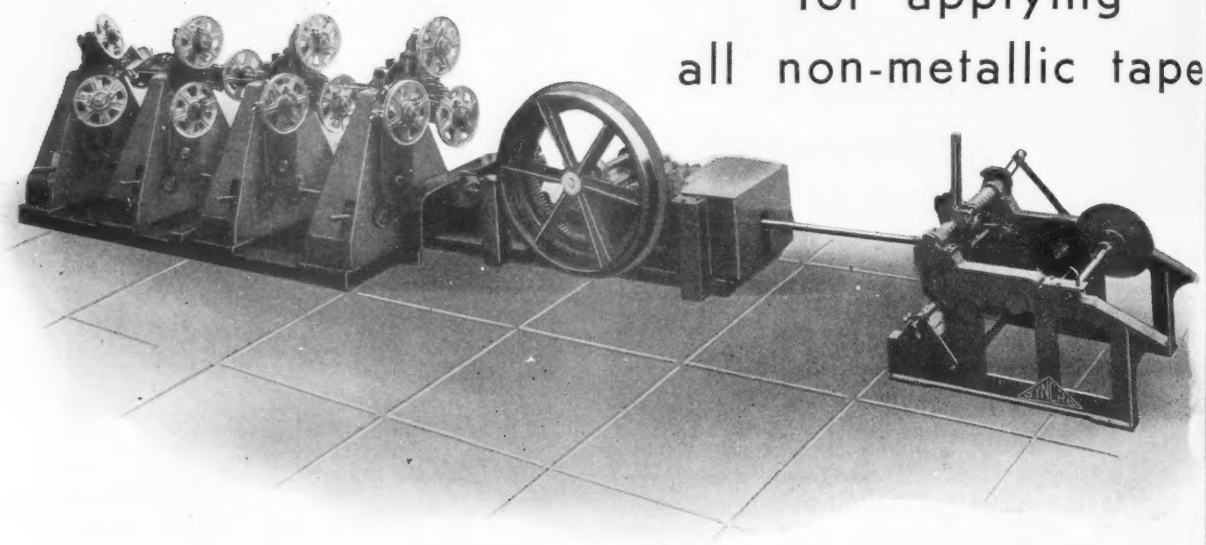
If you make it of wire . . . make it of the best

U·S·S AMERICAN

OIL TEMPERED *Steel Spring* WIRE

USS AMERICAN MANUFACTURERS WIRE UNITED STATES STEEL

THE *Syncro* ET-14-L Eccentric Type TAPING MACHINE for applying all non-metallic tape



THE Syncro ET-14-L eccentric type Taping Machine is complete with Capstan and Take-Up. All three units are operated by one motor through a positive mechanical drive which maintains the speed of each unit in correct relation with the others.

THE machine illustrated is the 12 pad type, but similar machines can be furnished with more or less pads as desired. The pads are adjustable for tape angle or offset and automatic broken tape or end of package stops are provided. The rotating spiders can be furnished with either two or three heads. Each stand is equipped with forward, reverse and neutral speed controls.

SPECIFICATIONS

- Cable diameter up to 1"
- Capstan Diameter-36"
- Capstan equipped with Fleeter Ring
- Maximum Taping Head Speed-400 R.P.M.
- Tape Width-1/4" to 1"
- Tape Tension adjustable up to 10 Lbs.
- Package Diameter 14" maximum.

SYNCRO MACHINE COMPANY

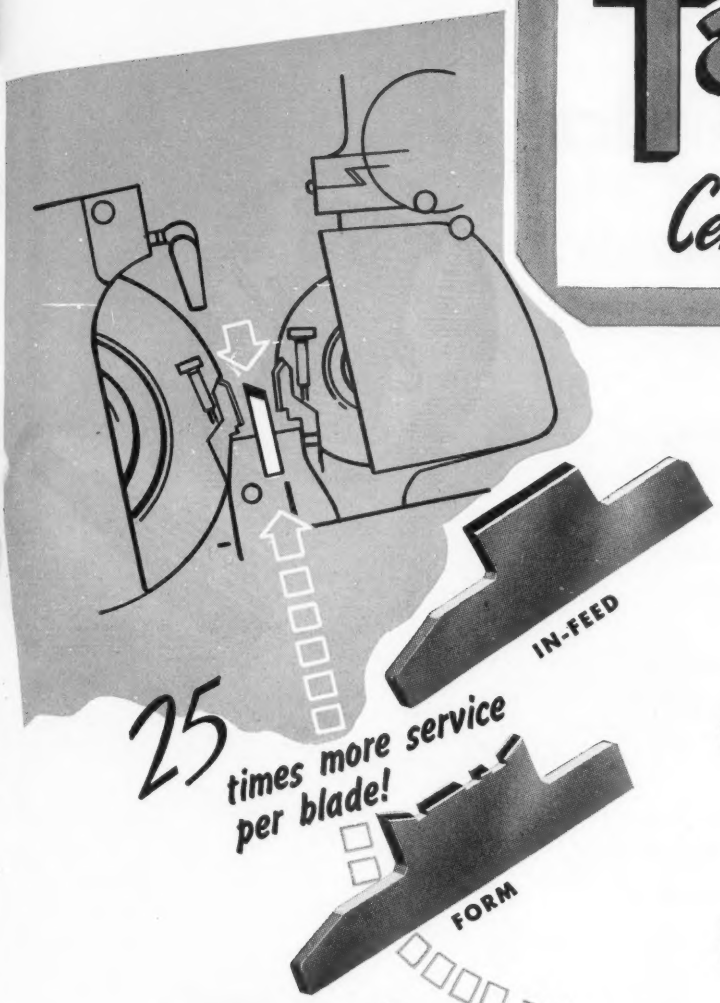
EXECUTIVE OFFICES AND GENERAL WORKS—611 SAYRE AVENUE, PERTH AMBOY, N. J.

Machinery for the Wire Industry

SYNCRO

Talide
(TUNGSTEN CARBIDE)

Centerless Blades



ADVANTAGES

- Service life at least 25 times longer.
- One solid strip — no sections, lines, or seams to mark or score the work. (Only Metal Carbides makes Tungsten Carbide wear strips in one solid piece of any length.)
- Continuous operation reduces cost, scrap and down time.
- Blades available from stock.

STANDARD TALIDE BLADES SHIPPED FROM STOCK

We carry Talide centerless grinder blades and other standard Talide products at the following warehouses:

Newark, N. J., 166 Bloomfield Ave.

Youngstown, Ohio, 107 East Indianola Ave.

Chicago, Ill., 601 W. Milwaukee Ave.

(Sales engineers in Newark, Pittsburgh, Detroit, Indianapolis and Chicago.)

In addition to standard blades, we design and manufacture form or step blades for use in grinding parts with multiple diameters, steps, tapers, contours or other special shapes.

Forward part or drawing for estimate.

TALIDE METAL MEETS EVERY REQUIREMENT

A service life of 25 to 1 for Talide Blades over others is conservative. On most applications, these blades outwear cast iron, tool steel or hard-faced blades as much as 50 to 75 times.

Finished ground by diamond wheels, Talide work supports (made from hardest metal known) have exceptional surface quality and finish. To preserve this quality, we protect the Talide strip with a special plastic coating and pack each blade in an individual carton.

For the full production story, send for Talide Blade catalog 46-WP, complete with prices, sizes and specifications.

SINTERED CARBIDES
METAL CARBIDES CORPORATION
MC TALIDE
YOUNGSTOWN, OHIO.
HOT PRESSED CARBIDES

METAL CARBIDES CORPORATION

YOUNGSTOWN 5, OHIO *Pioneers in Tungsten Carbide Metallurgy*

CUTTING TOOLS · DRAWING DIES · WEAR RESISTANT PARTS

Specialized

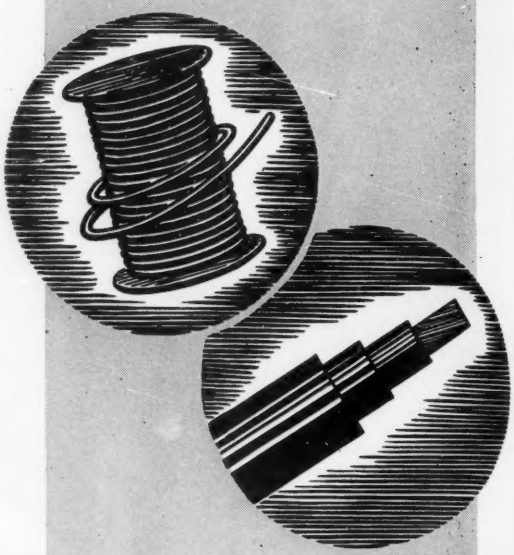
RESEARCH EXPERIENCE

In Insulating Wire Finishes

You are invited to attend a meeting of minds between your engineering staff and ours. The experience of our technical staff embraces all types of insulating finishes to meet the most exacting requirements.

Every formulation is engineered to individual specifications for the particular service required.

Special emphasis should be directed to our non-toxic, flame proof, impregnating compounds and solutions. Also to all types of wire and cable lacquer coatings.

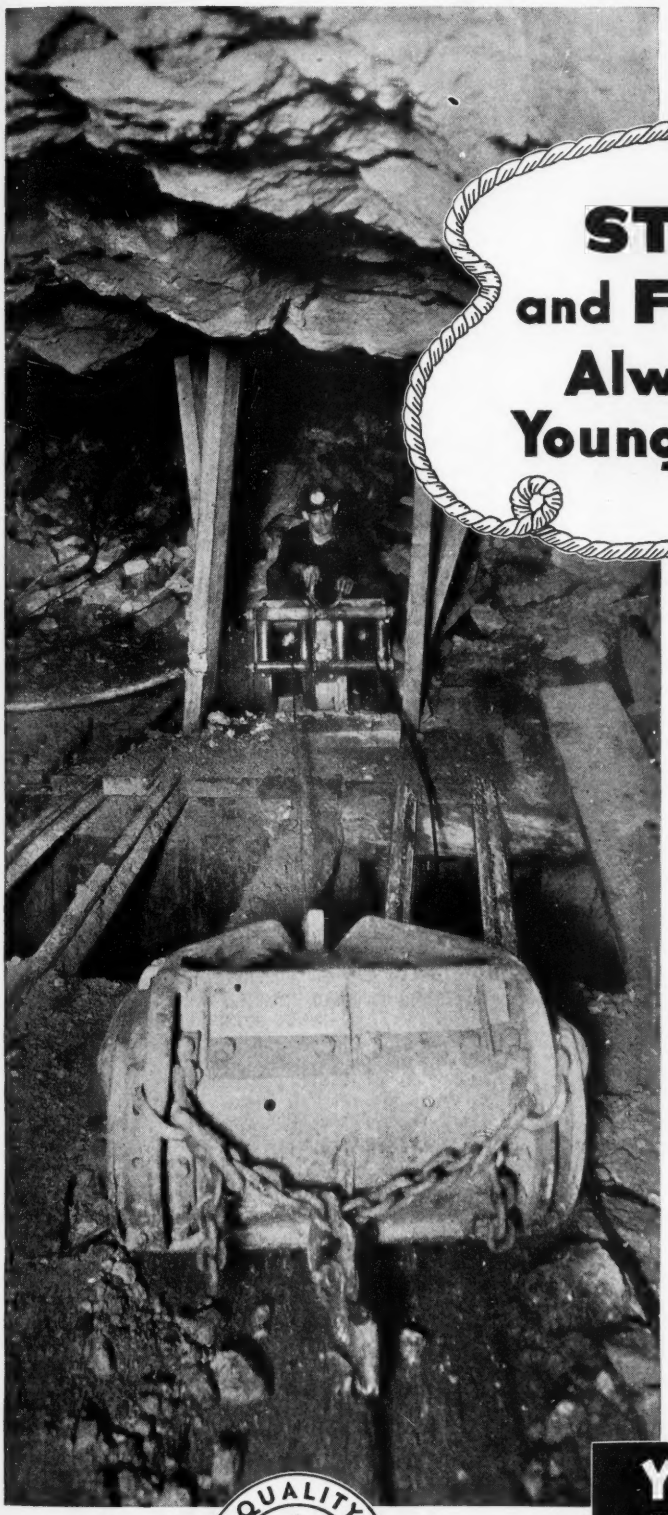


STANDARD VARNISH WORKS

Engineers of Product Finishes

NEW YORK — CHICAGO

SERVING INDUSTRY FOR 75 YEARS



STRENGTH and FLEXIBILITY Always "*Firsts*" in Youngstown RopeWire

Miles Under Ground

IN few industrial services can a cable break be more costly than in the remote reaches of underground mining--costly to repair or replace, costly to production, costly sometimes to human life.

Above all-below ground--wire rope must be strong and flexible, tough and corrosion resistant. These essential properties depend on the quality of the wire from which the rope is woven.

Specify Yolectro High Carbon Rope Wire and you can depend on it that your wire rope will have these wanted qualities and will keep them through a long lifetime of dependable service. Like all Youngstown wire mill products, Yolectro High Carbon Rope Wire is produced from the finest quality steel, refined, rolled and drawn to exacting specifications.

Photo by courtesy of the Preformed Wire Rope Information Bureau.

QUALITY TRADE MARK YOUNGSTOWN SERVICE

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

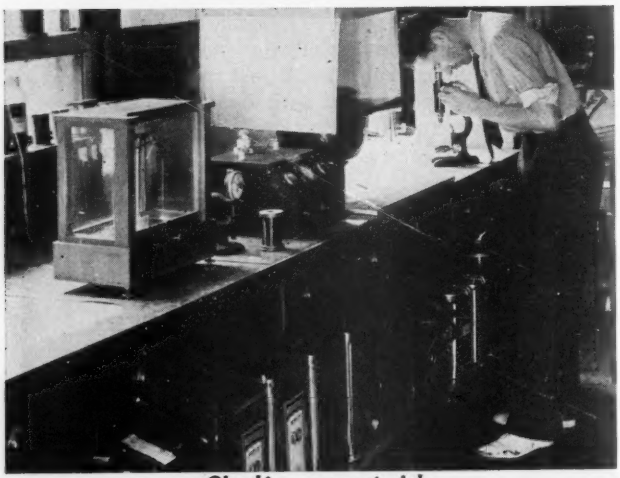
Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Bars - Rods - Wire - Cold Drawn Carbon Steel Rounds - Electrolytic Tin Plate - Coke Tin Plate - Pipe and Tubular Products - Sheets - Plates - Conduit - Tie Plates and Spikes.

Custom built spools for high speed winding

Mercury testing for continuity of film



Checking raw materials

Don't "fool around"... USE DEPENDABLE WIRE PRODUCTS!

A product, too, is only as strong as its weakest part. Follow the practice of leading designers and engineers by specifying only service-giving wire . . . wire that has built up a reputation for "delivering the goods under fire."

Hudson Wire products, designed for discriminating manufacturers, has just such a reputation in the fine wire field. Offering greater flexibility and tensile strength, perfect laying at higher speeds, new coating methods and reduced coil dimensions without sacrificing electrical values, Hudson Wire products will probably lower your production costs considerably. Check these three points:

QUALITY — All phases of manufacture, from ingot to final processing, are carefully supervised and fulfilled in the same manner you would carry out in your own plant. There are no unimportant phases in the work.

UNIFORMITY — By mercury process tests, our engineers can guarantee perfect uniformity in wire; from the smallest to the largest order. No more variations in consistency, structure or electrical properties . . . every inch of wire exactly as specified, more than meeting your requirements.

SERVICE — If you have a wire problem, our complete design and engineering facilities are at your disposal without obligation. Send your specifications and blueprints for our recommendations; or if you are not quite ready, write for samples of these quality products.

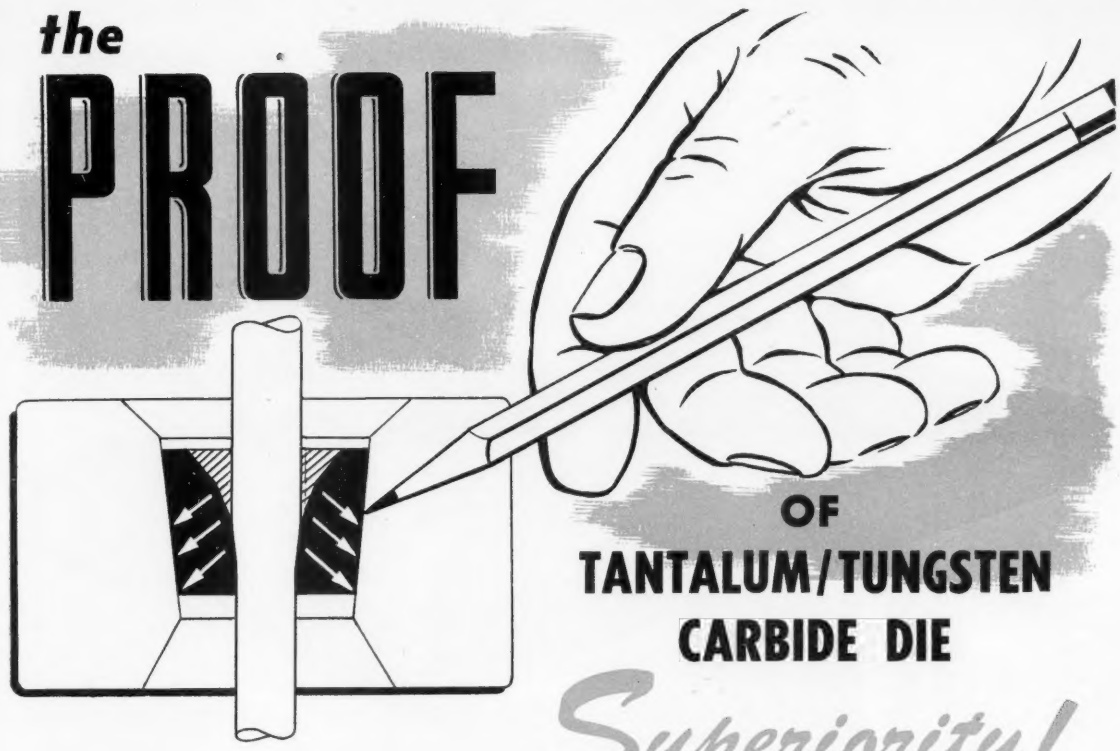
Enameled Copper, Enameled Iron, Enameled Alloy, Enameled Aluminum, Silk Covered, Cotton Covered, Celanese Covered, Glass Fibre Covered, Twisted Multiples, Parallel Multiples, and Litzendraht

HUDSON WIRE CO.

Winsted Division

WINSTED CONNECTICUT

the PROOF OF TANTALUM/TUNGSTEN CARBIDE DIE *Superiority!*



The V-R "Tapered Nib" standard round hole carbide die design is the most important and practical improvement in die design offered to industry in the past decade.

GREATER STRENGTH

Tapered nib design increases absorption of drawing stresses. Side walls of nib are taper-gripped resulting in tremendous internal strength.

SIMPLE MAINTENANCE

Tapered grip casing means no steel casing to cut for refinishing or resizing . . . a real saver.

MAXIMUM VISIBILITY

Extra wide tapered front and back openings permit simple easy inspection.

CONCENTRICITY

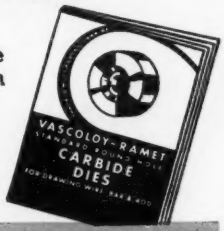
V-R method of precision die manufacturing assures you of a perfect, concentric drawing surface.

FREE OF POROSITY

Another outstanding achievement of V-R die quality control is the elimination of porosity in carbide.

HIGHER FINISHES

V-R Tantalum/Tungsten carbide die nibs take a higher finish than any other die material.



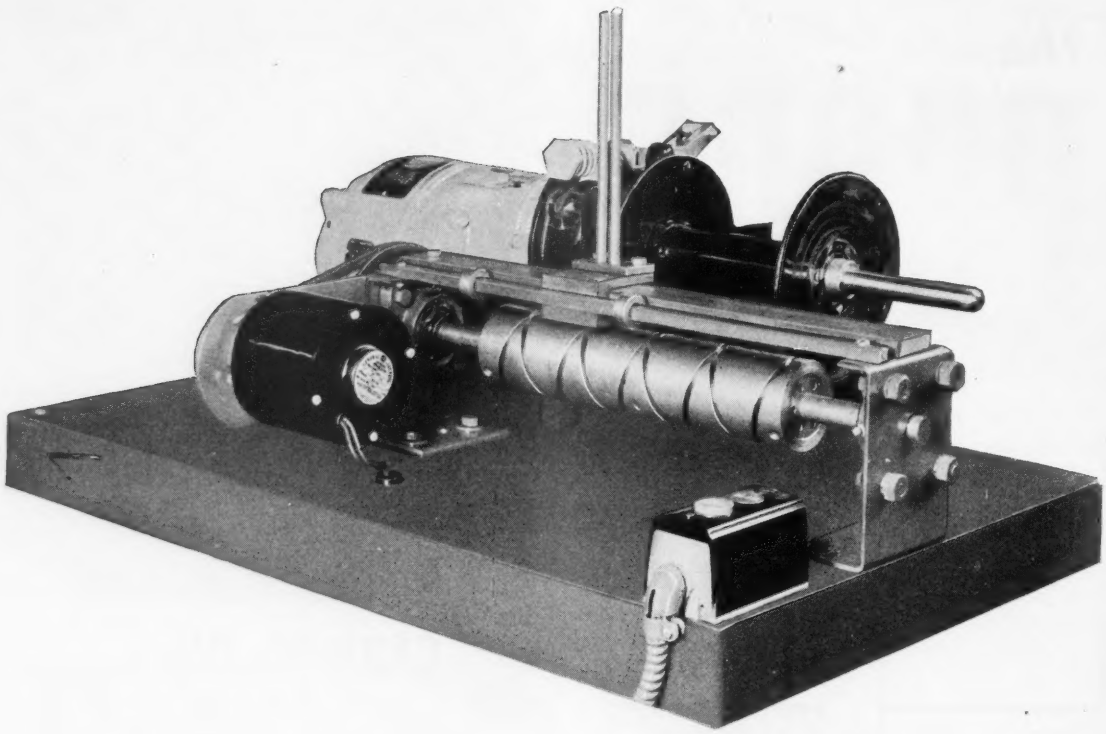
MAKERS OF WORLD'S FINEST VR Carbides

Write for your copy of Carbide Die Bulletin VR-348 today!

VASCOLOY-RAMET CORPORATION NORTH CHICAGO ILLINOIS, U. S. A.

District Sales and Service in Principal Cities

AN AFFILIATE OF FANSTEEL METALLURGICAL CORPORATION AND VANADIUM ALLOYS STEEL COMPANY



Motor-Driven Adjustable Traverse

In this design, the width of traverse is controlled by two adjustable stops. There are no gear, clutches, no limit switches or electrical contactors. Alternation occurs automatically and is actuated by an entirely new and eminently trouble-free principle.

For widths up to 14 inches, the price of the motor driven traverse only is $105.00. For the complete spooler and electrical control, the price is $500.00; both quotations are F.O.B. Wallingford, Conn. Deliveries are being made promptly from stock. Glad to send further information on request.

DAVIS

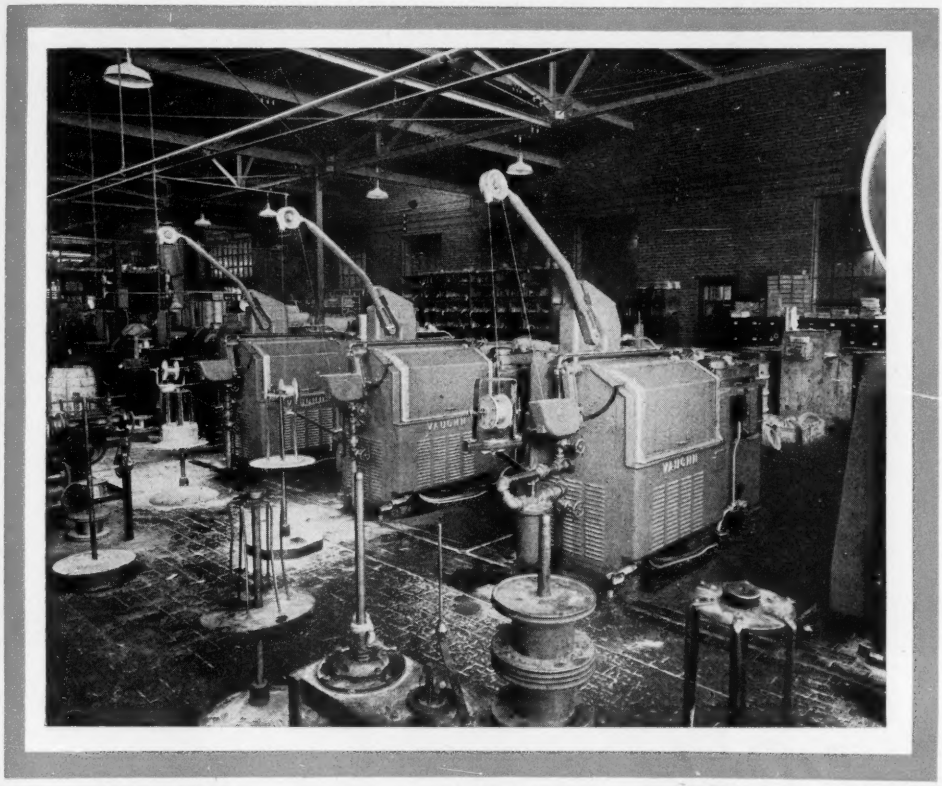
EQUIPMENT

FOR THE

WIRE INDUSTRY

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

THE R. L. DAVIS ELECTRIC CO., INC., WALLINGFORD, CONN.



WHEN DRAWING FINE WIRE SIZES, WS-104 MEANS:

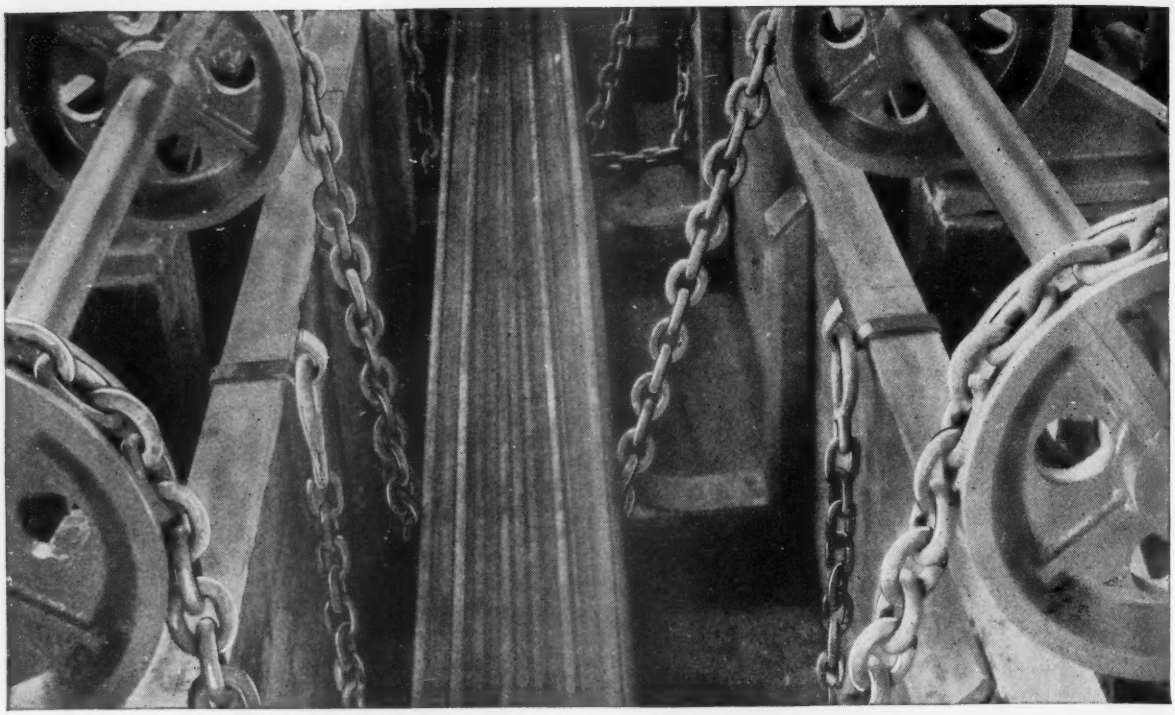
1. Increased pounds of wire per hour
2. Longer die life
3. Elimination of straight oil where it was necessary to use oil before
4. Greater cooling ability
5. Less evaporation
6. A clean film-free finished wire

WS-104 is a light red colored oil of medium viscosity, easily emulsifiable in hard or soft water, making a very stable emulsion. Does not require temperature control and is possessed of extreme pressure characteristics. WS-104 is particularly suited for any of the cupro-nickel alloys at high speed drawing.

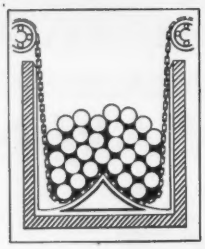
No matter what your wire drawing problem may be, we can help you.

Apex Alkali Products Co.

MAIN AND RECTOR STS., PHILADELPHIA 27, PA. • PHONE: MAnayunk 8-3939



A "Sweet" Pickler



MONEL CHAINS *in the Weldco mechanical pickler move up and down alternately, revolving stock and exposing all surfaces. At left, Monel "spreader" which helps revolve load, crack oxide scale and increase agitation. Sprockets, chain, and tank trim are also Monel. (Fabricated by* Youngstown Welding & Engineering Company, Youngstown, O.)

● You've seen mechanical picklers before.

But have you come across one with all the features of this *Weldco* job?

Developed by the YOUNGSTOWN WELDING AND ENGINEERING COMPANY, Youngstown, Ohio, it handles everything from bars, flats and tubes to rounds, squares and hexagons. Automatically raises and lowers up to 10-ton loads at whatever speed you set. Cuts pickling time as much as 40 to 60 per cent.

Yet that's only the beginning. The *Weldco* mechanical pickler saves steam, acid, labor and maintenance besides.

Take the "spreader," a device that breaks up the load and makes it roll. This not only increases agitation, but also helps crack oxide scale. You get *faster* pickling . . . uniform action on *all* surfaces . . . reduce over-pickling . . . save steel.

The spreader – like all exposed parts of Youngstown's Weldco mechanical pickler – is made of Monel*. Experienced pickling room men know the *additional* savings that Monel makes possible.

For Monel withstands attack by hot sulfuric acid and other pickling solutions in common use by steel mills. It retains its high strength and resistance to corrosion. It assures more continuous operation . . . requires less time out for repairs.

You get these advantages, too, when you specify Monel for crates, racks, baskets, hooks, chain and accessories. Whether you measure loads in pounds or tons . . . whether you pickle sheets, tubes or castings, tiny screw machine products or heavy stampings . . . *Monel is the practical, economical metal for the job.*

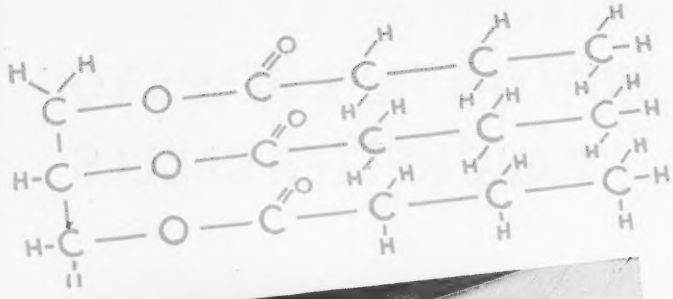
Monel*

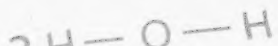
THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

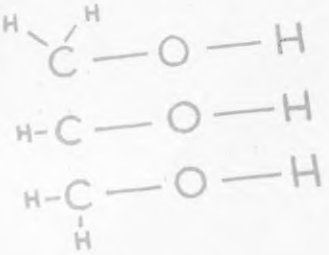
NICKEL (INCO TRADE MARK) ALLOYS

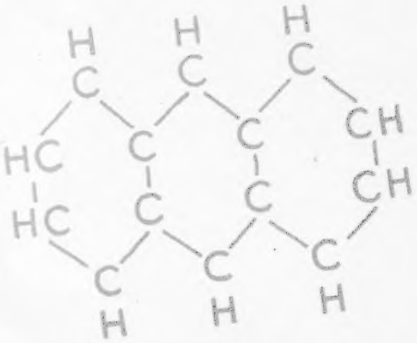
MONEL* • "K"* MONEL • "S"* MONEL • "R"* MONEL • NICKEL • "KR"* MONEL
INCONEL* • "Z"* NICKEL • "L"* NICKEL

*Reg. U. S. Pat. Off.









CHEMISTRY BY SPECIFICATION

THERE is more to Chemistry today than meets the eye. It is no longer a more or less hit or miss, trial by error method of testing now this combination, now that. Improved formulas are explored and achieved based on known structures, weights and movements of molecule and atom, and on skillful mathematical computations.

In the field of wire drawing lubrication lie possibilities for improvement that challenge the highest skill of industrial chemistry. We therefore give it our specialized attention and study, knowing that it is only by close application in this field that we can achieve the improvements you specify as essential to the desired success of your over-all wire-drawing operation.

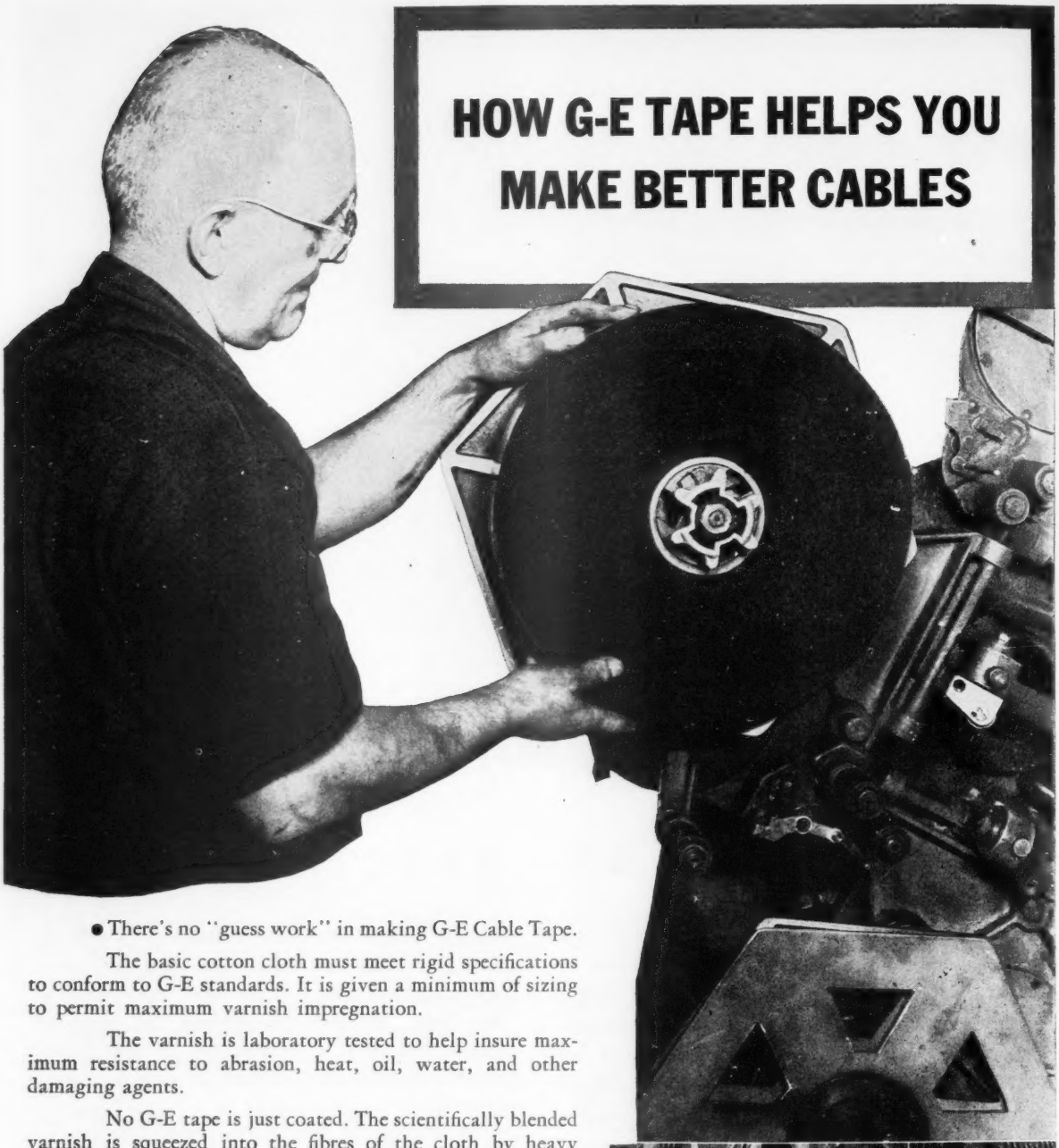
We welcome these "calls by specification" upon our ingenuity and chemical skill. Do not hesitate to make your wire lubrication problems ours to solve as well . . . Address Technical Department.

STANDARD · STANDARDIZE WITH STANDARD · INDUSTRIAL COMPOUNDS CO. INCORPORATED

Manufacturers-Metal Working Compounds

4600 W. FERDINAND ST. · CHICAGO 44, ILLINOIS

HOW G-E TAPE HELPS YOU MAKE BETTER CABLES



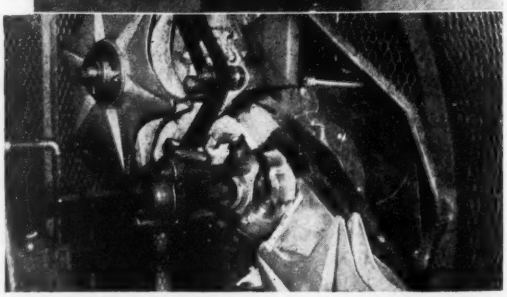
• There's no "guess work" in making G-E Cable Tape.

The basic cotton cloth must meet rigid specifications to conform to G-E standards. It is given a minimum of sizing to permit maximum varnish impregnation.

The varnish is laboratory tested to help insure maximum resistance to abrasion, heat, oil, water, and other damaging agents.

No G-E tape is just coated. The scientifically blended varnish is squeezed into the fibres of the cloth by heavy rollers. This pressure application insures a thorough impregnation. A constant temperature of 100F keeps the varnish at an even viscosity and results in a soft, pliable finish that is adhesive but not tacky. Huge drying ovens kept at a controlled temperature give the tape a thorough baking. Final tests determine the high dielectric strength, the mechanical strength, and the exceptionally low power factor. All G-E tapes must be up to or exceeding I.P.C.E.A. specifications.

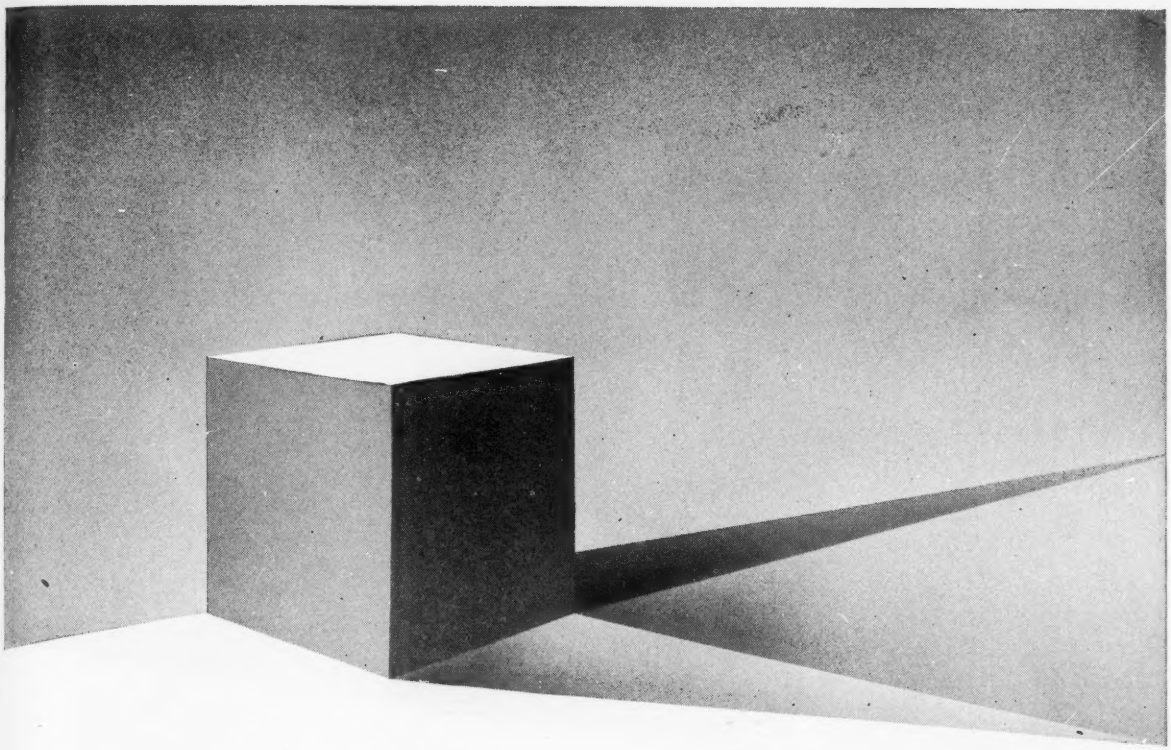
General Electric also specializes in making insulation tapes to manufacturer's specifications. For complete details write to Section RIMA-WP1, Resin and Insulation Materials Division, Chemical Department, Schenectady, N. Y.



Machine for wrapping varnished cloth tapes on cable.

GENERAL ELECTRIC

CD46-T4



A hairline off = an imperfect cube

A hairline off dimension affects the weight, area and length of four sides of a cube.

Seemingly incidental, but in the consideration of precision machinery, that hairline can mean money and trouble.

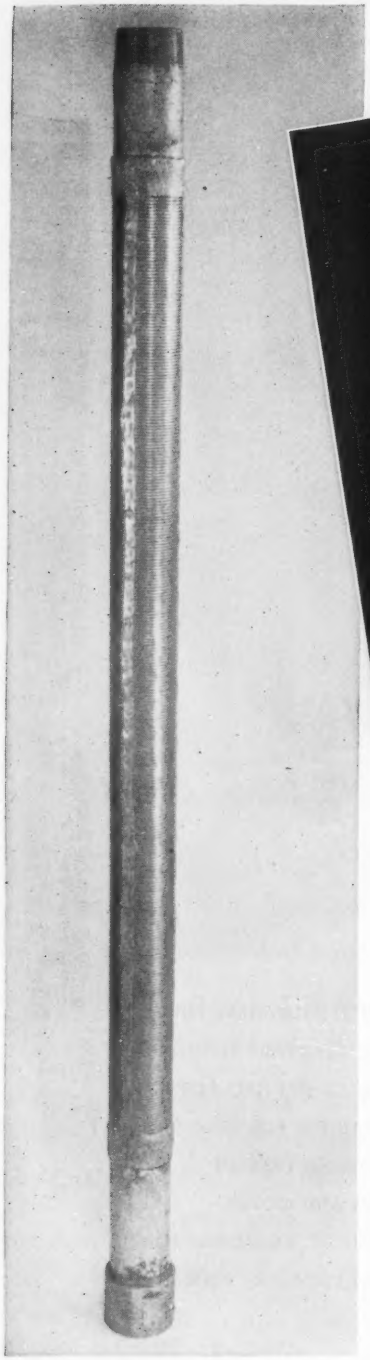
One part, one-thousandth of an inch off, can upset the smooth functioning of a high piece of equipment . . . resulting in constant adjustment . . . even costly repair . . . and not quite perfect work.

Robertson equipment is precision made . . . as perfect as any man-made product can be. And, it is made by craftsmen skilled from many years of making Robertson machinery only. Carefully made and tailor-made . . . to your exacting specifications.

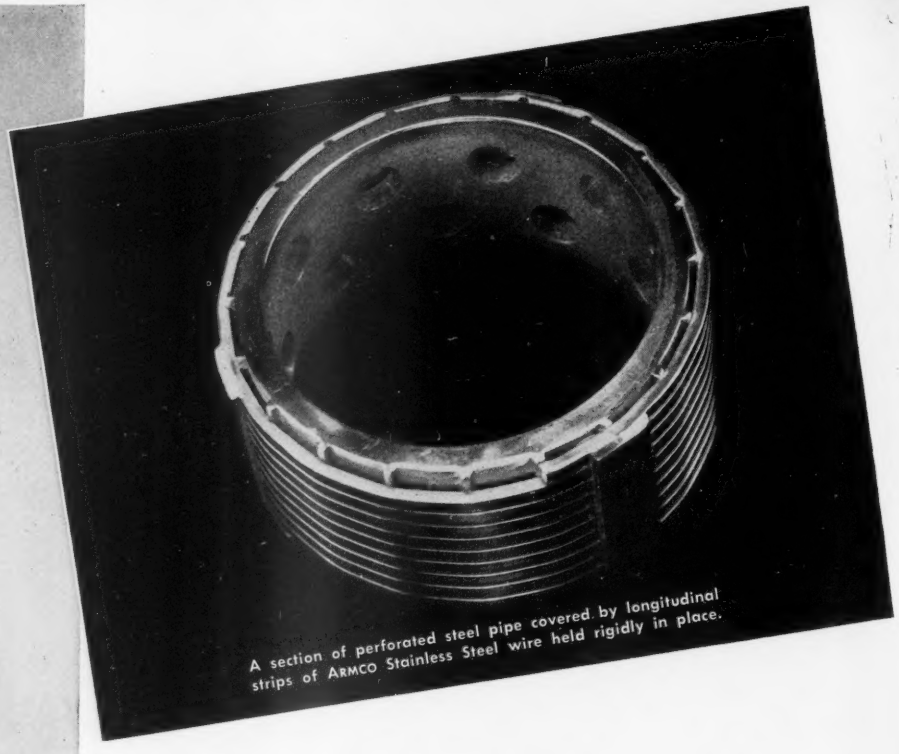
Remember the name: *Robertson* and link it with *"Precision Made Equipment."*

HIGH-PRESSURE HYDRAULIC PUMPS
LEAD SHEATH STRIPPING MACHINES
CLOSED LEAD MELTING POTS
SPECIAL DIE BLOCKS
EXTRUSION PRESSES
DIES AND CORES
HYDRO-PNEUMATIC ACCUMULATORS
CABLE LEAD ENCASING PRESSES

JOHN Robertson
COMPANY, INCORPORATED
125-135 WATER STREET, BROOKLYN 1, NEW YORK
Designers and Builders of all Types of Lead Encasing Machinery
Since 1858



After the ARMCO Stainless Steel screen wire has been wound the full length of the pipe several bands of solder are applied to maintain the exact mesh openings.



A section of perforated steel pipe covered by longitudinal strips of ARMCO Stainless Steel wire held rigidly in place.

THIS SCREEN WIRE FILTERS OIL 8,000 feet underground!

"Buried" in soil deep as 8,000 feet, ARMCO Stainless Steel wire fights severe corrosion and abrasion to a standstill in these oil well sand screens.

Its job is to filter the fine sand from crude oil. Otherwise sand would gum up valve and pump parts—literally cut them to pieces in a short time.

Yet resistance to abrasion is only one of the reasons why ARMCO 18-8 Stainless Steel, Type 304 wire is used here. It beats down the corrosive attacks of water, brine, and the various acids in crude oils. Failure would mean a complete shut-down, plus costly repairs and replacements.

Wire spacings vary from .006" to .015", depending on the diameter of pipe and type of sand. Rectangular, keystone or half-keystone sections are used. A typical size is .100"x.135" for rectangular wire, and .095" x .059" x .049" for keystone sections.

Wire for this job must be of uniform temper, excellent finish, and drawn to close tolerances.

WRITE FOR DATA

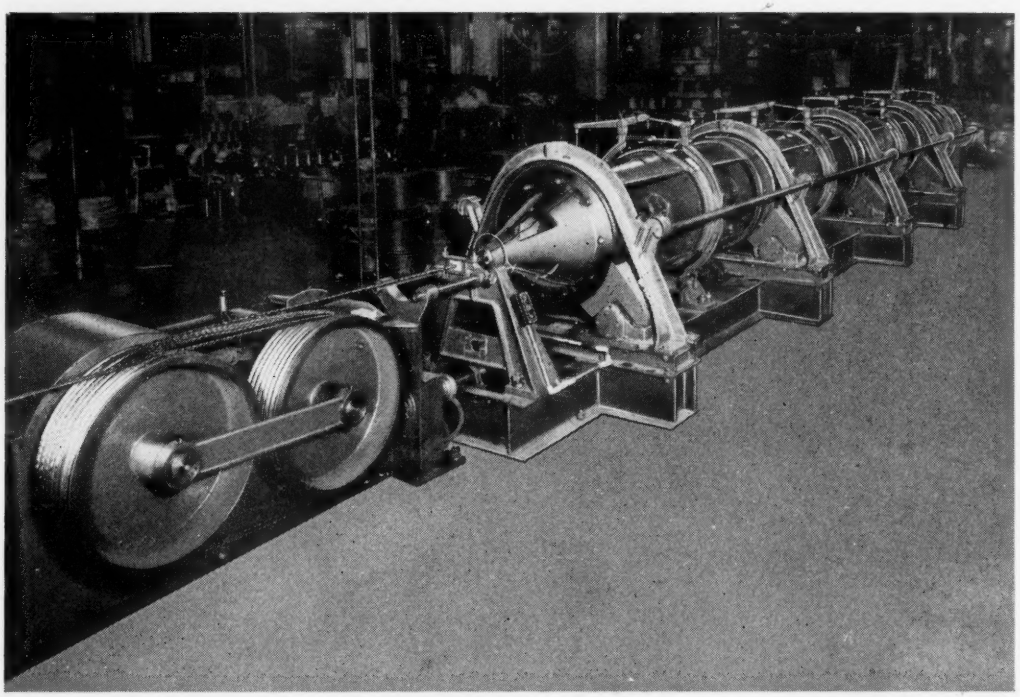
Whether you use fine or large stainless steel wire, Armco's Rustless Division can supply it to your exact specifications. Write for data pertaining to your products. The American Rolling Mill Company, Middletown, Ohio; Rustless Iron & Steel Division, 3419 E. Chase St., Baltimore 13, Md.

THE AMERICAN ROLLING MILL COMPANY • **RUSTLESS IRON & STEEL DIVISION**

Rustless Division of ARMCO

LOOK FIRST TO ARMCO FOR STAINLESS STEEL WIRE

HIGH SPEED STRANDERS



The New England Butt Company is prepared to furnish HIGH SPEED STRANDERS, as illustrated, for stranding or laying up copper or steel cables, in standard bobbin sizes, namely:

ST-8	8"	Diameter	Bobbin	40 lbs.
ST-12	12"	"	"	100 lbs.
ST-16	16"	"	"	250 lbs.
ST-22	22"	"	"	500 lbs.

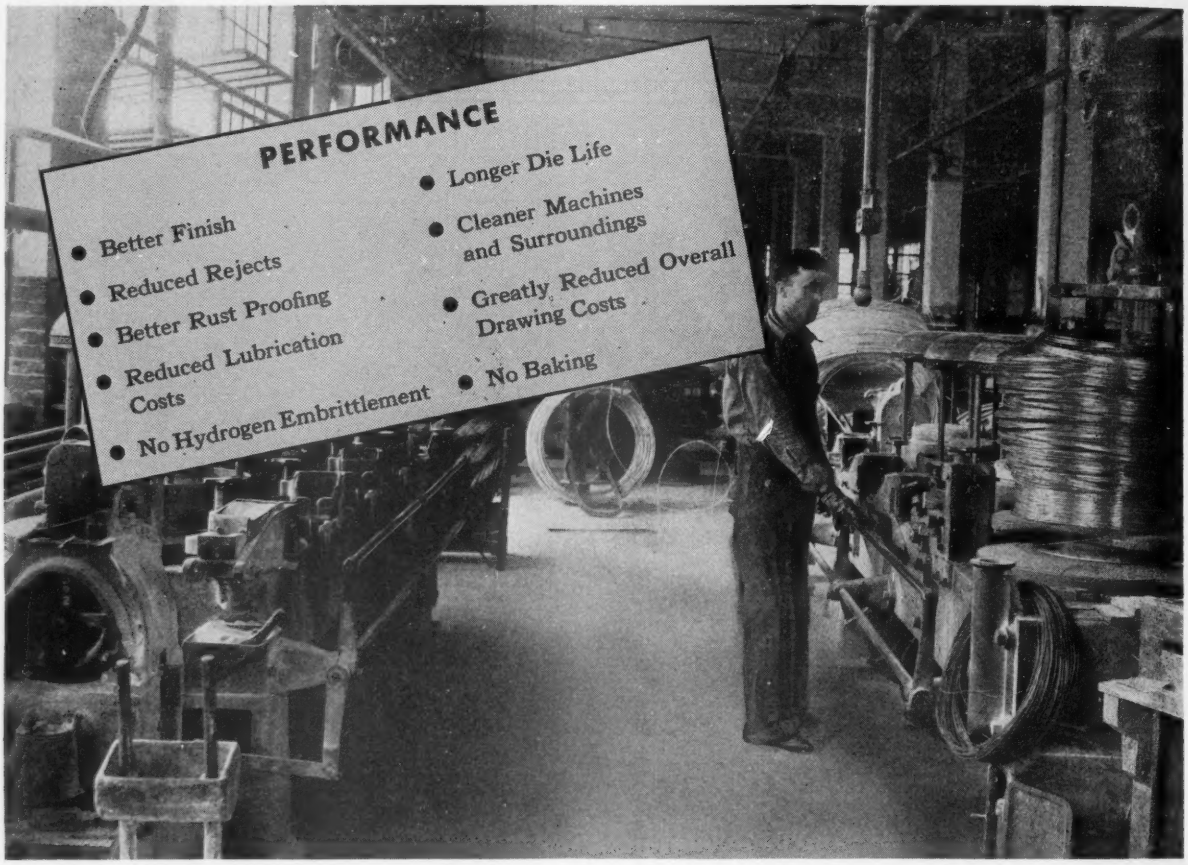
Capstans may be of the double drum type illustrated, or single capstans with flat or tapered face.

Pitch of twist or lay may be varied by change gears or variable speed transmission units as desired.

Write for circular No. 73

NEW ENGLAND BUTT COMPANY

ESTABLISHED 1842
304 PEARL STREET
PROVIDENCE 7, RHODE ISLAND, U. S. A.
JAMES DAY (MACHINERY) LTD., "FORD HOUSE," 88 REGENT ST., LONDON., W. 1. ENGLAND



Drawing Without Lime and the Advantages It Offers

WHEN you can eliminate the expense and trouble of liming and baking, you have made a worthwhile improvement in drawing operations. But when you use

MAGNUS METAL COAT #267

to accomplish this purpose, you get a lot extra besides. You'll get a better finish, particularly on stock drawn for metallic coating and other special finishes. You'll have a great deal fewer rejects caused by scratching and off size wire. Your rust proofing will be better and you'll have no trouble with hydrogen embrittlement — which is eliminated right in the #267 solution.

Your dies will last longer and you'll save plenty in lubricating costs because #267 requires light lubrication.

You shouldn't overlook the values inherent in the cleaner machines and improved working conditions which the elimination of liming offers you. But the nubbin of the whole question is the fact that, in spite of the much higher initial cost of Magnus Metal Coat #267, your ultimate cost per ton of drawn wire will be a great deal less than when lime is used.

It's worth looking into!

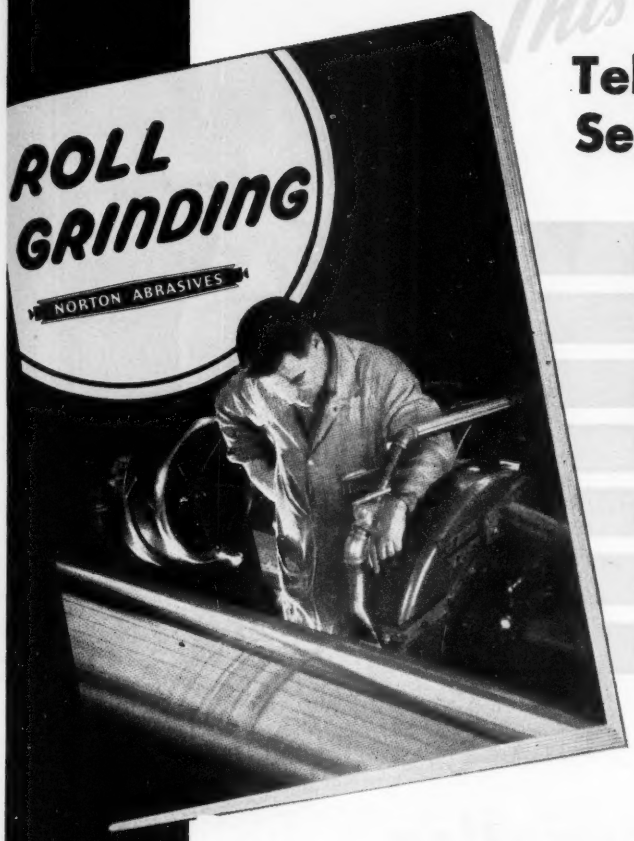
Magnus Wire Drawing Compounds

MAGNUS CHEMICAL COMPANY • 188 South Avenue, Garwood, N. J.

Service Representatives in Principal Cities

IN CANADA — MAGNUS CHEMICALS, LTD., 4040 RUE MASSON, MONTREAL 36, QUE.

WHAT KIND OF ROLLS ARE YOU GRINDING?



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HOT MILL ROLLS
COLD MILL ROLLS
STECKEL MILL ROLLS
TINNING ROLLS
PAPER MILL ROLLS
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COPPER ROLLS

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IF you are grinding any rolls in your plant you'll surely want a copy of this booklet. It's completely new from cover to cover—over 50 pages of practical information on the selection and use of wheels for grinding all kinds of rolls. Mail the coupon today for your copy—there's no charge nor obligation.

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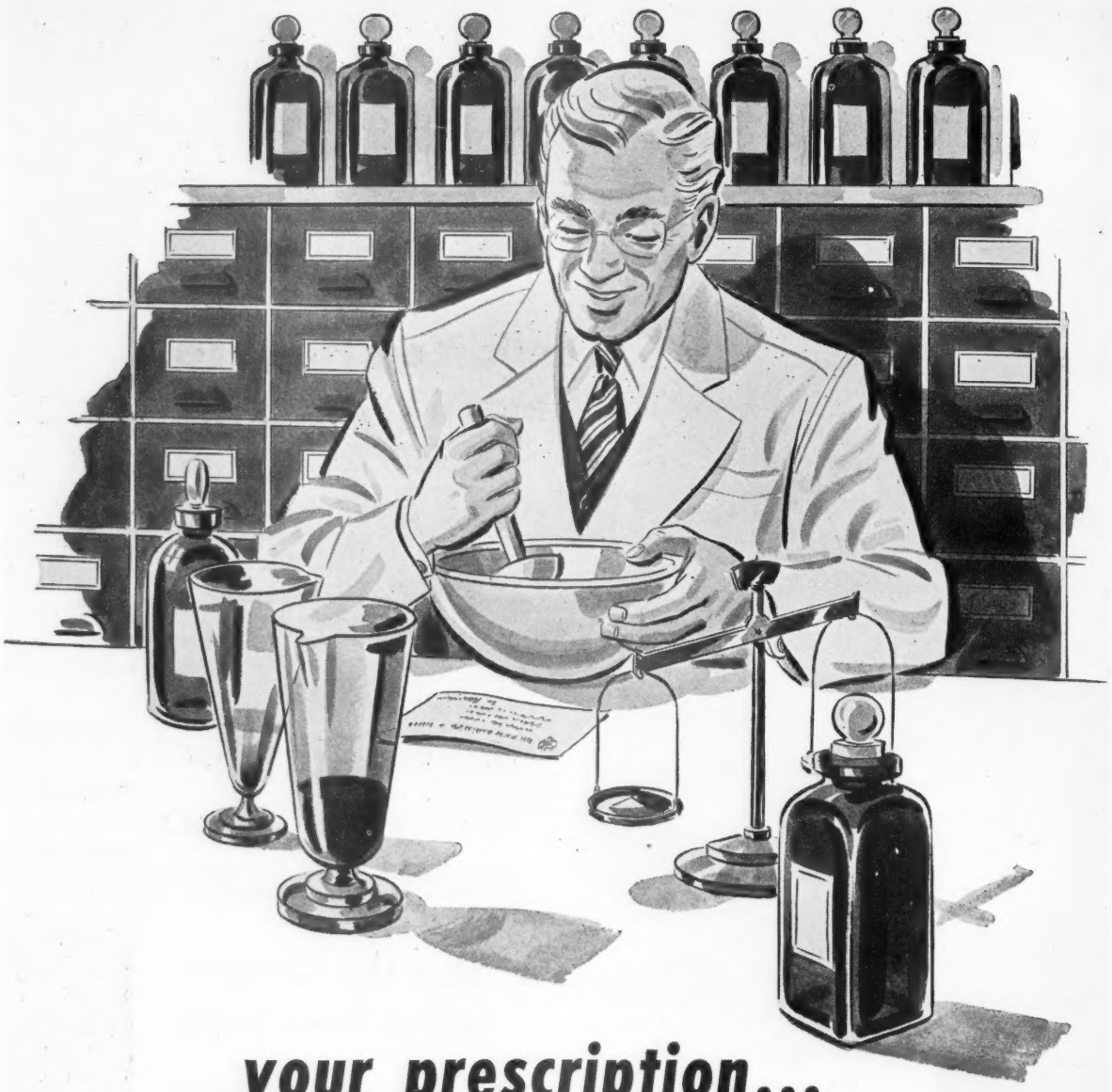

your prescription...

JUST WHAT THE DOCTOR ORDERED!

You take a prescription to your pharmacist with complete confidence. He will compound it with the utmost care. You know you will get exactly what the doctor has ordered for your well-being—according to his expert diagnosis of your individual case. Users of industrial wire cloth have that same confidence in Reynolds metallurgists and weaving experts. The wire cloth they create for you . . . and your precision product . . . will be fabricated exactly to meet every condition your product imposes on it — right down to the most minute detail! More than fifty years of Reynolds engineering "know how" is at your disposal. Consultation involves neither cost nor obligation.

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Industrial
WIRE
CLOTH

WIRE IS AVAILABLE

You can get it in Alcoa Aluminum

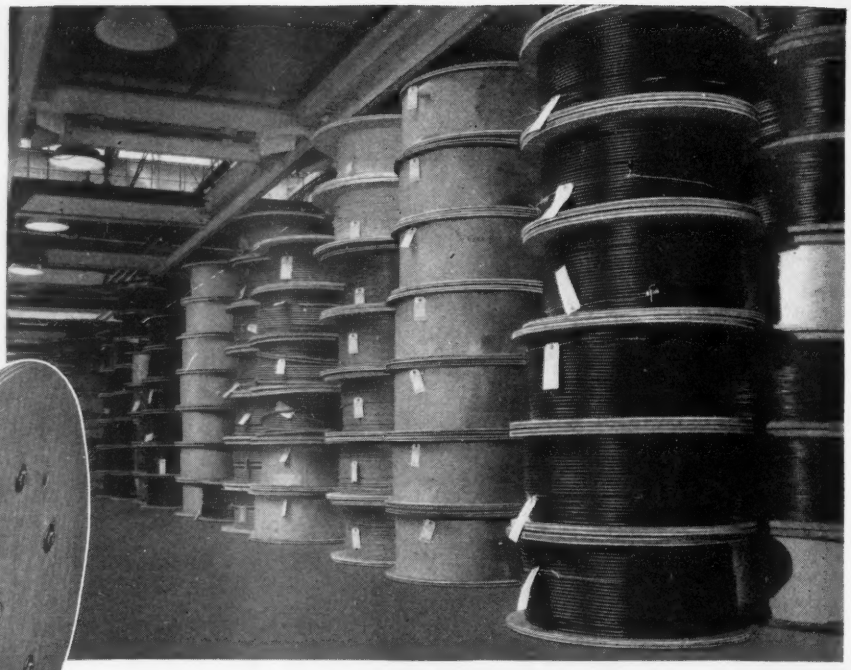
There *is* a bright spot in the supply picture. If you need wire you can get it in Alcoa Aluminum. Available in standard alloys and tempers. Aluminum Company of America, 1828 Gulf Building, Pittsburgh 19, Pennsylvania. Offices in principal cities.

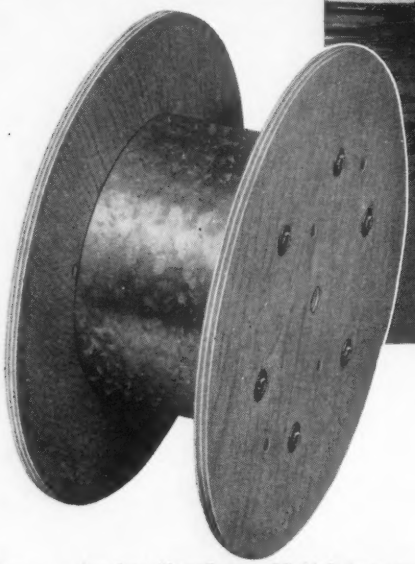
ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

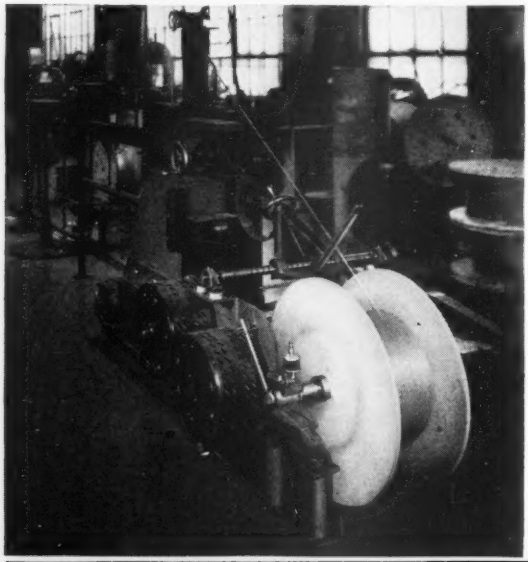
HUBBARD
Light Weight REEL

WOOD HEAD . . . METAL OR CARDBOARD TRAVERSE





Above . . . American Phenolic type RG high frequency cable of various types ready for shipment, wound on Hubbard light weight reels. Below . . . A low-loss insulated wire is taken up on a light weight reel, after conductor has been insulated with a plastic insulating (Polyethylene) material.



LIGHT WEIGHT AND STRONG

for handling and shipping operations

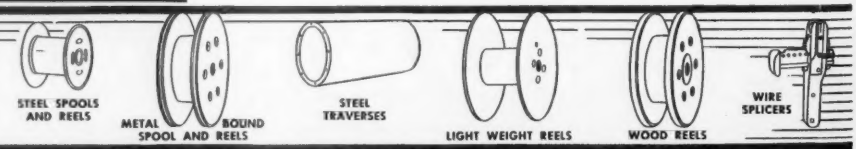
The American Phenolic Corporation, Chicago, Illinois puts the Hubbard Light Weight Reel to work on practically every step in producing low-loss high frequency wire and cable. From the initial production operation, where the core of the cable is drawn through an extruder head to apply a plastic insulation, to the final stage of shipping, these light weight reels provide a practical, dependable means of handling cable.

Hubbard Reels of this type are made with plywood heads; the traverse is sheet metal, galvanized. Internal traverse brace rods result in reel rigidity and maintain alignment of parts. Traverses can be supplied also made of heavy gauge cardboard. Hubbard products include spools, reels, and traverses of every size and type required in wire making and shipping. Let Hubbard be your dependable source of supply.

HUBBARD SPOOL COMPANY

1624 Carroll Avenue Chicago, Illinois

Hubbard



SINCE 1912 MANUFACTURERS OF WIRE DRAWING · ANNEALING · SHIPPING SPOOLS AND REELS

Attention: WIRE MANUFACTURERS

Over 7,000 Electrical Appliance Manufacturers Will Know Each Month Beginning in April . . . That Only Owners of JLE Wire Labelling Machines Can Supply Them NOW With UNDERWRITERS' P.S.* LABELLED CORD and CORD SETS!

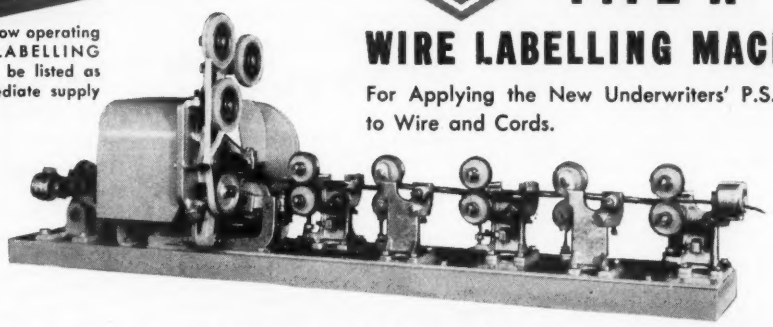
Full Page 2-Color Ads In ELECTRICAL MANUFACTURING Will Tell Them!

Specially Prepared Direct Mail Messages Will Tell Them!

Manufacturers now operating JLE WIRE LABELLING MACHINES will be listed as sources of immediate supply in these ads!

JLE TYPE A WIRE LABELLING MACHINE

For Applying the New Underwriters' P.S.* Labels to Wire and Cords.



IMPORTANT SELLING FEATURES of the NEW UNDERWRITERS' P.S.* LABEL INCLUDE:

1. The fact that the new Underwriters' label has all the NATIONALLY RECOGNIZED features that the old type metal-insert bracelet type label earned through years of advertising but has *NONE* of THE COSTLY DISADVANTAGES. Thus CONSUMER ACCEPTANCE of the Underwriters' P.S.* Label is ASSURED! A new label of any other type would, of course, start from scratch to build such an acceptance . . . a long, expensive job!
2. The new Underwriters' P.S.* Label won't (like the old type metal-insart label) "stick out" like a sore thumb, won't nick hands or tear stockings or drapes with sharp metal edges, won't rust, WILL stay on the cord as a neat, clean, seal of approval for the life of the appliance.
3. The new Underwriters' P.S.* Label gives electrical appliance manufacturers for the FIRST TIME a label that keeps pace with the advanced design and quality of their products . . . a label that actually HELPS TO SELL THEIR APPLIANCES because it clearly illustrates at the point of consumers' sale that they've used UNDERWRITERS' INSPECTED and APPROVED CORD for the PROTECTION of their customers.

ASK NOW for a complete proposal on the installation of one or more new JLE WIRE LABELLING MACHINES. GET IN ON THE JLE PROMOTION TO YOUR CUSTOMERS, THE ELECTRICAL APPLIANCE MANUFACTURERS. ACT NOW! *Write Today!*

*Pressure-Sensitive

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43 CHURCH STREET, PAWTUCKET, RHODE ISLAND

World's Leading Manufacturer of Spark-Testing Equipment

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64 FRONT ST. W.
TORONTO, ONT.

British Associates:
GENERAL ENGINEERING CO., LTD.,
BURY ROAD, RADCLIFFE,
LANCS., ENGLAND

This advertisement is reaching an audience of 2,200,000 consumers and executives

· READERS OF ·

Time Magazine and United States News

...featuring another electrical product that utilizes FIBERGLAS' exclusive advantages

...it's another example of why the swing is to FIBERGLAS

...Another reason why more and more people are:

Asking for Fiberglas in the things they buy—considering its superior qualities to improve the things they make.

Kilowatts are coming to this house ...wrapped in glass!

They needed more cable for home building. They needed rugged, sturdy cable to carry the heavy electrical load that homes require today.

So electrical engineers took their clue from a host of wartime marine and naval uses—where glass, Fiberglas electrical insulation materials, had done a vital job.

And then a new development was born —building cable *wrapped in Fiberglas yarn* —strong, flexible, fire and moisture-resistant, economical, easy-to-install.

Today, this new electrical application of Fiberglas yarn has taken its place in America's vital home building program. It adds its values to those other Fiberglas products making important contributions to good construction and better living—home insulation, refrigerator, range, water heater insulation, "Dust-Stop" air filters for modern warm air furnaces.

Fiberglas is the trade-mark for this electrical insulating material, and for a long list of products made of light, strong, heat and moisture-resistant, ageless glass in pliable fiber form.

Ask for Fiberglas in the things you buy. Consider its superior qualities to improve the things you make. For information about this Fiberglas product, write to Owens-Corning Fiberglas Corporation, Dept. 801, Toledo 1, Ohio. Branches in principal cities. *In Canada: Fiberglas Canada Ltd., 1200 Bay St., Toronto, Ontario.*

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Write for information about building cable wrapped in Fiberglas yarn. And, if you design, specify or use electrical insulating materials, be sure to have a copy of catalog EL46-11. Owens-Corning Fiberglas Corporation, Dept. 875, Toledo 1, Ohio. Branches in principal cities. *In Canada: Fiberglas Canada Ltd., Toronto 1, Ontario.*

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ELECTRICAL INSULATIONS

The Wire Outlook

Conflicting trends are in evidence. Sheer economic forces, by which the big steel companies hope to maintain themselves in business, are pushing prices up, whereas two large manufacturers, important consumers of wire, have announced downward price revisions of consumer products. Actually the two situations may not be as incompatible as they first appear. The raw materials of manufacturing may be going up, but the cost of production of finished products is dependent on three factors to an important extent — wages paid to workers, volume of production and output per man-hour.

There was some hope last year that labor would see on which side its bread was buttered and buckle down to do an honest day's work. Stories filter in to indicate that this happy solution to many of our economic problems has not yet come to pass and that labor, as a whole, still sees no reason why it should exert itself to make money for its employers. Justification for high wages can only come out of more efficient work. Nevertheless, the production rate *is* moving up, but it is felt that purchasing power has somewhat diminished. High taxes are a contributing factor, when it is considered that on many products they will total as much as a third of the final cost of goods to the consumer — another reason for drastically cutting Federal expenditures, which in themselves are inflationary, tending to unstable conditions.

Copper shortages may curtail some brass and wire mill operations, in spite of the fact that in January consumption by copper fabricators reached 139,263 tons, a peacetime high. Some of the shortage is directly atiributable to the failure of Congress to remove the duty on imports, so sorely needed.

The advance in the price of lead is expected to spur production and bring out of hiding considerable amounts of lead scrap. Lead is held to be nowhere as critical as a year ago. Cable makers got 9,895 tons in January, nearly a thousand tons more than the month before. Total lead supplies for this year are expected to run over 900,000 tons, against a need for 1,000,000 tons.

Zinc shortages in Prime Western and Special High Grade remains acute, with other grades in reasonably good supply. Some improvement in the supply of the better grades is anticipated for the second quarter.

1947 tin production will fall far short of demand. No definite forecast has been issued by the CPA, since 1947 allocations have not been made by the Combined Tin Committee. Government stocks, now about 53,000 tons, will be exhausted by the end of the year.

Aluminum production is high, but not sufficient to meet the demand. 1,100,000,000 pounds were made in 1946, of which 131,000,000 pounds went into structural shapes, bars, rods and wire. Clothesline wire is taking a heavy proportion of the last.

Nail production in 1946 responded to the stimulus of the premium payment plan, reaching 18,500 tons in December. The 1947 outlook is for 932,000 tons, 150,000 tons over 1941 and 83,000 tons over 1943, the record peak. The demand is so great that it will be some time before local dealer stocks are normal.

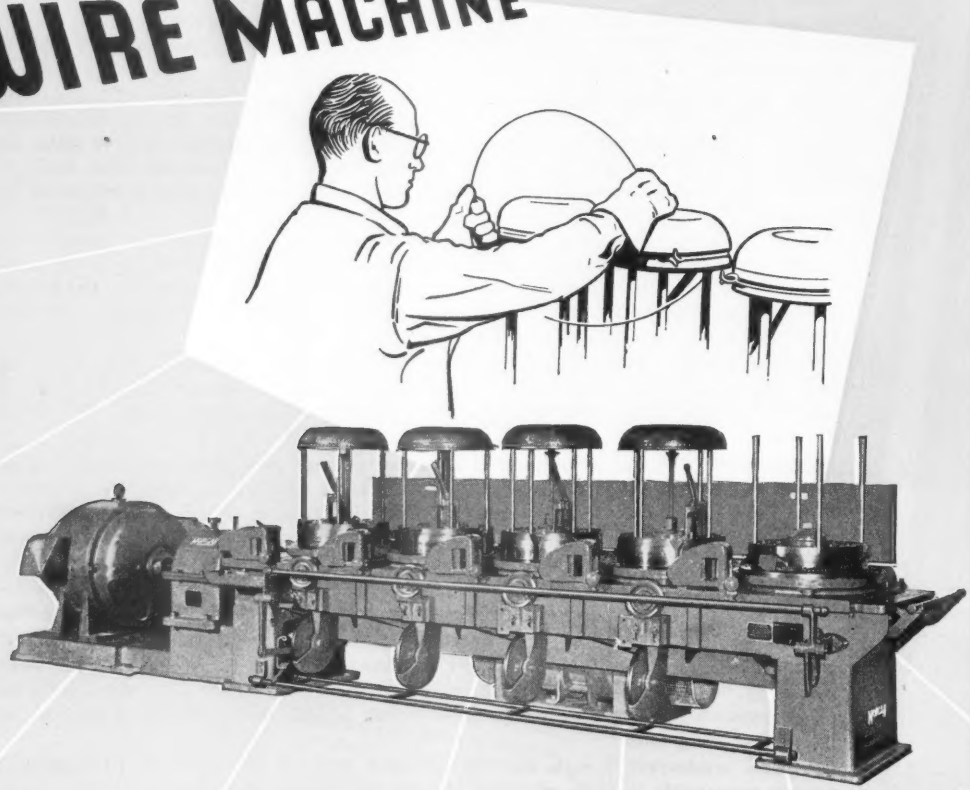
Manufacturers' galvanized wire is in heavy demand; with the coming of Spring, the demand for wire for weaving is growing, with little hope of an adequate supply. Wire rope needs have taken a spurt, as a result of growing activity on the part of equipment manufacturers. Backlogs of orders for electric wire are large.

Gas shortages cut the supply of rods toward the end of Winter and as all wire operations were affected, adequate supply is not expected this year. Pressure of demand for all wire and wire products is so heavy that allocations to manufacturers shows no signs yet of being boosted. Bale tie wire, communications wire and barbed wire supply continues critical. With it all, consumers are tending to become selective and to refuse substitutes.

The country still eagerly awaits Congressional action on sound labor laws, curtailment of many needless government activities and a better than balanced budget. It is our firm conviction that economy and strength go hand in hand and that even our splendid fighting forces can be made to learn that effectiveness does not necessarily entail wasteful extravagance. That industrialists generally feel a growing optimism, is in itself a good sign. Congress must not let us down.

—from the Editor's Desk

MORGAN-CONNOR WIRE MACHINE



ROLLING UP RECORDS IN WIRE PRODUCTION

The world's largest producers of wire are rolling up greater production records than ever before . . . with Morgan-Connor wire machines.

Morgan men have developed the Morgan-Connor principle of wire-making from careful research and years of close contact with wire mill men. Their experience and skill applied to modernizing or equipping your mill will mean more efficient production with lower costs.

Call a Morgan man to work with you.

MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

WM-13

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 22 APRIL 1947 No. 4

Designated as
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Contents

Editor's Desk 273

Manufacture of High Frequency Cables
by K. Zimmermann and
S. F. Luques 277

Introduction of Aluminum Building Wire
Overcomes Copper Shortage, Light Metal
Also Found Practical for Other Electrical Cables 282

Sectional Rope Units
by Richard Saxton 284

Preventive Maintenance of Spring Coiling
Machines and Some Spring Coiling Experiments
by C. R. Bergevin 288

Management and Post War Labour Problems as
Seen in Britain
by T. W. Fazakerley 293

Government Wire Production Information 295

Outstanding Personalities of the Wire Industry 298

A Review of Recent Wire Patents 303

Index to Advertisers 320

Where-to-Buy 321-324

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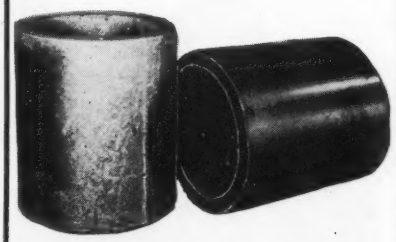
FLANGED STEEL
TRAVERSES



FOR WIRE AND CABLE

Sizes: as light as 18 gauge steel and as large as 56" in diameter and 56" in traverse. Furnished in plain, painted or hot-dipped galvanized finishes. Width of flange and size and number of bolt and drain holes made to fit customer's requirements.

Assembly costs reduced by eliminating labor of handling a large number of small parts. Number of trips per reel increased 50% to 100% before cut downs or complete scrapping is necessary.

Manufactured under license arrangements with Western Electric Co., Inc.

NILES STEEL
PRODUCTS DIV.
of
REPUBLIC STEEL CORP.
NILES, OHIO

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DIES

and

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WIRE
AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 22 APRIL, 1947 No. 4

Manufacture of High Frequency Cables

by K. Zimmermann and S. F. Luques

Engineers Intelin Division
Federal Telephone and Radio Corporation
New York, New York.

The design of co-axial transmission lines presented many difficulties. This paper describes the requirements for such cables and methods of manufacture.

ONE of the most important contributions to the expansion of the use of high frequencies in applications such as radar, instrument landing, FM, and television was the development of the electrically precise, durable, semi-flexible high frequency cable. Designed to meet the demands of the war effort, this essential component of virtually all high frequency apparatus, occupies an equally important role in the peacetime electronic world.

* * *

WHILE successful use of high frequencies was demonstrated as far back as March, 1931, when **International Telephone and Telegraph Corporation** introduced Micro-ray radio, no substantial interest was aroused in ultra short wave equipment until England faced with the exigencies of the war, developed the aircraft detection system now known as radar. This equipment, which operates at high frequencies and requires transmission lines to its antennae presented the first real demand for high frequency transmission lines.

* * *

IN fundamental design, this type of transmission line consists of a center conductor (or two conductors in certain balance types) surrounded by a low loss, solid dielectric material, a braided copper outer conductor or shield, and an outer protective covering. Electrical and physical properties such as characteristic impedance, power handling capacity, voltage and temperature ratings and physical dimensions are dictated by the requirements of the application. In general, coaxial transmission lines are designed for a characteristic impedance of 50 to 150 ohms.

* * *

THE design of high frequency transmission lines, particularly the semi-flexible type used in tanks, airplanes, trucks, or demountable equipment such as direction finders, radar, etc., was not easy. The main problem was that of developing a suitable dielectric to separate the inner and outer conductors, for at high frequencies the transmission of the electromagnetic wave actually occurs through this dielectric; the conductors acting mainly as a wave guide.

* * *

THIS dielectric, therefore, has to meet rigid electrical as well as mechanical requirements It has to be flexible, durable, have a low power loss factor and many other properties which have to be maintained over a wide temperature range varying from 40°C to 85°C.

* * *

DURING the early stages of the United States' participation in the war the only types of suitable dielectric material available in sufficient quantity were various mixtures of polyisobutylene, certain rubber derivatives and, in some cases polystyrene, each manufacturer employing a mixture most suited to his own ideas or manufacturing requirements.

* * *

MOST of these materials possessed certain adequacies, namely, limited elevated temperature operation, relatively low hardness and thermal softening point, rather wide variations in mechanical and

electrical characteristics, extremely difficult manufacturing and extrusion properties, and a shortage in the supply of the necessary rubber derivatives.

* * *

POLYETHYLENE, of which considerable has been published in the trade literature, was made available in sufficient quantity to replace practically all of the earlier types of materials in the latter part of 1943, and many of the cable manufacturing and performance problems were thereby eliminated or materially reduced.

* * *

Outer Conductors

THE outer conductors or shields are formed by braiding plain or tinned copper wire over the dielectric material in a basket weave construction, using standard types of wire braiding machinery. Sizes of wire and braid constructions are determined by questions of flexibility and electrical loss characteristics. Since high frequency currents attempt to travel in straight lines, following the shortest available path, and to crowd toward the surface of conductors, braid constructions are usually designed with the longest lay consistant with practical considerations of flexibility and braiding machine limitations. This assures minimum electrical loss in the braid.

* * *

IF additional shielding is required a second braid may be applied, in which case a shorter lay may be used for maximum flexibility.

* * *

Protective Jacketing Materials

PRIMARY requirements of the protective jacketing materials are:

a. **Resistance to deformation at elevated temperatures.**
b. **Flexibility at low temperatures.**
c. **Resistance to water, oil, gasoline, or other chemicals.**
d. **Freedom from corrosive effects on copper.**
e. **Freedom from deleterious effects on polyethylene.**
f. **Ease of extrusion to close dimensional tolerances.**
g. **Flame resistance.**

* * *

SYNTHETIC thermoplastic materials of the plasticized polyvinyl chloride or polyvinyl chloracetate type have been found to possess a combination of properties generally suitable for this use, although with respect to a few of the above requirements commercially available materials are somewhat lacking. Low temperature flexibility is limited to about -40° to -50°C and can be improved only by a sacrifice in deformation at elevated temperatures. Corrosion of plain copper braids may be encountered under certain conditions, and the plasticizers from the jacketing material may bleed into the polyethylene causing a serious increase in the electrical losses. The last named defect has been largely eliminated in a new type of vinyl compositions, commonly known as a "non-contaminating" jacket material, developed by the **Federal Telephone and Radio Corporation.**

* * *

The Manufacture of Solid Dielectric Cable

THE development of a suitable dielectric was but one of the problems confronting the manufacturer of solid dielectric cables. How to put it on wire and hold its diameter to the close tolerances called for by the stringent impedance requirements of the Government specifications was another. Such tolerances were as low as + or — 5 mils in special cases, and the majority of cable specifications called for a diameter tolerance of + or — 10 mils.

* * *

THE use of synthetic thermoplastic materials for wire and cable insulation required several basic changes in the design of rubber tubing machinery. Unvulcanized rubber stocks of the type long used for wire insulation purposes required comparatively little mechanical working to bring them to the proper consistency for extrusion, and this consistency was often obtained by pre-warming on a two-roll mill. Consequently the tubing machine acted primarily as a conveyor and a device to build up sufficient pressure to form the rubber around the wire. A steam

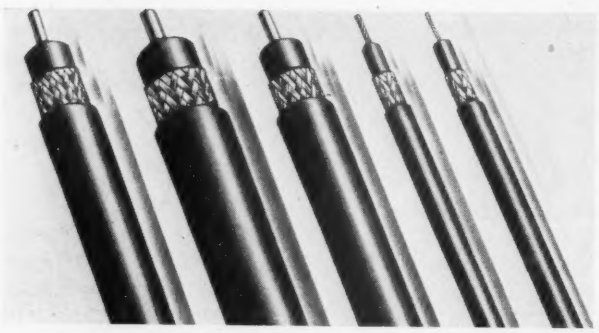


Fig. 1 — Several types of high frequency cable.

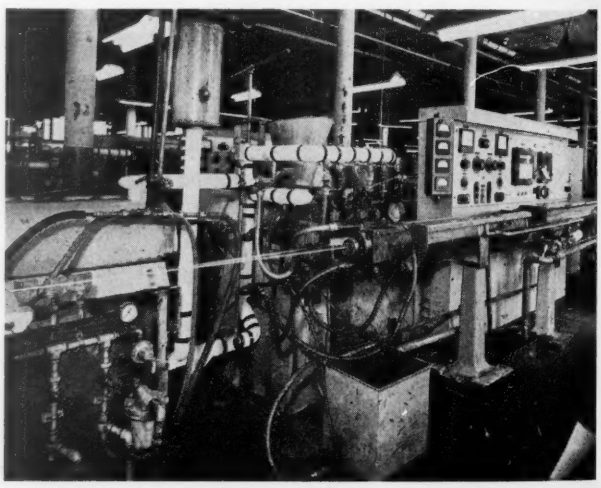


Fig. 2 — Extruding machine showing extruder head control panel and hopper used in the manufacture of high frequency cable.

heated short barrel machine with a deep cut worm having a single thread of uniform pitch was found to give optimum delivery and product uniformity.

* * *

WITH the advent of thermoplastic materials it was immediately apparent that this type of machine was unsuitable. Considerably greater mechanical working was required to bring the material to the proper extrusion consistency. Higher temperatures were essential, and the temperature build up had to be accomplished primarily by internal frictional working. To accomplish this it was found desirable to increase the length of the worm and barrel by approximately 50 per cent, to add a breaker plate, backed up by steel wire screens, at the end of the barrel, and to alter the worm design.

* * *

THE breaker plate, a steel disk with a multitude of small diameter holes, backed up by one or more wire mesh screens, serves to hold the material back in the worm until, by the churning action of the worm and slippage of material between the thread surfaces and the cylinder wall, the material is brought to the proper plastic state. It is further broken down in passing through the screens and braker plate, backed up by steel wire screens, at the end of the barrel.

BY extending the length of the worm additional time was obtained for the above plasticizing action to take place. By using a single lead, narrow depth thread of decreasing pitch, improved frictional working and pressure build-up was obtained. The worm, in addition, is water cooled to prevent excessive temperature rise, with consequent thermal decomposition of the plastic material and sticking or burning on the worm.

* * *

OIL heating of the barrel jacket sections has been found to be more practical than high pressure steam heating methods, the oil being pump circulated through the system from electrically heated storage tanks. Actually, with most thermoplastic materials it will be found that the barrel sections need only be heated to bring the machine to the proper temperature, and once the extrusion has started sufficient heat will be developed by the frictional working of the material so that the oil circulation in those sections must be turned off, or the temperature of the circulating oil reduced so that the oil is acting as a cooling medium. Proper temperature balance is obtained by adjustment of oil circulation at the breaker plate, barrel sections, and head, and water circulation through the worm.

* * *

THE head and die design of the plastics extruder is extremely important and precautions should be taken to provide stream-lining of all parts, minimum volume of cavity, and elimination of "dead spots" or pockets where material may lie stagnant and decompose.

* * *

THE pictures on this page illustrate some of the equipment used in the manufacture of h-f cable. Figure 2 shows the polyethylene being extruded on the center conductor. After passing through the extruder the cable is led to the cooling troughs seen on the right. Since polyethylene has a high coefficient of expansion it must be cooled slowly to avoid the formation of small voids. This is accomplished by means of temperature controlled water troughs each slightly cooler than the other, starting at 98°C and gradually cooling-off to room temperature.

* * *

THE temperature of various sections of the long cooling trough is measured by means of thermocouples inserted along the trough, and which are brought to a switching system connected to a potentiometer. The temperature at various parts of the extruder itself can be similarly measured on a second temperature indicating device.

* * *

THE cable is then forwarded to the braiding section. Here the

(Please turn to page 318)

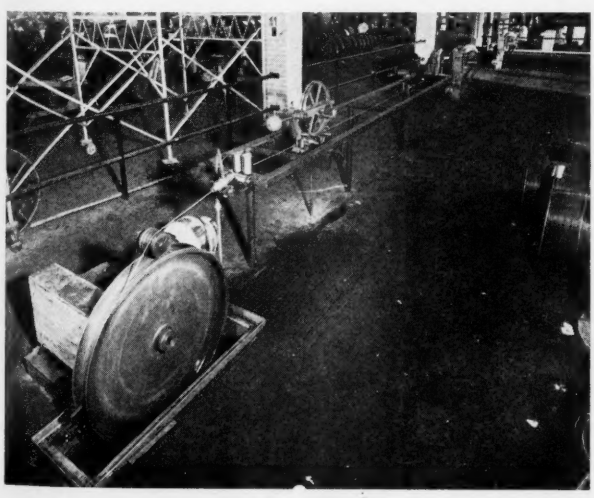


Fig. 3 — Extruder cable coming from water troughs and being reeled up in the manufacturing process of high frequency cable. * * *

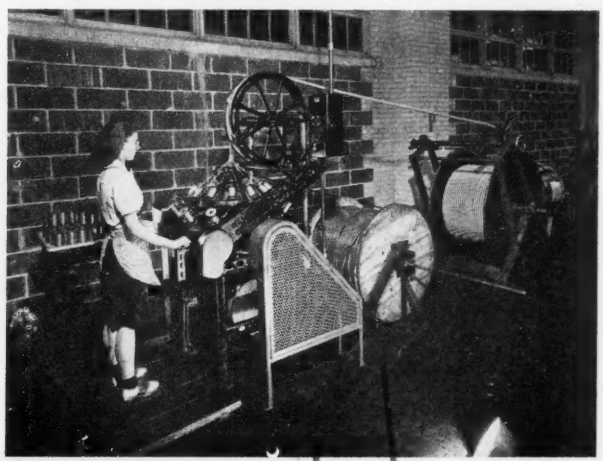
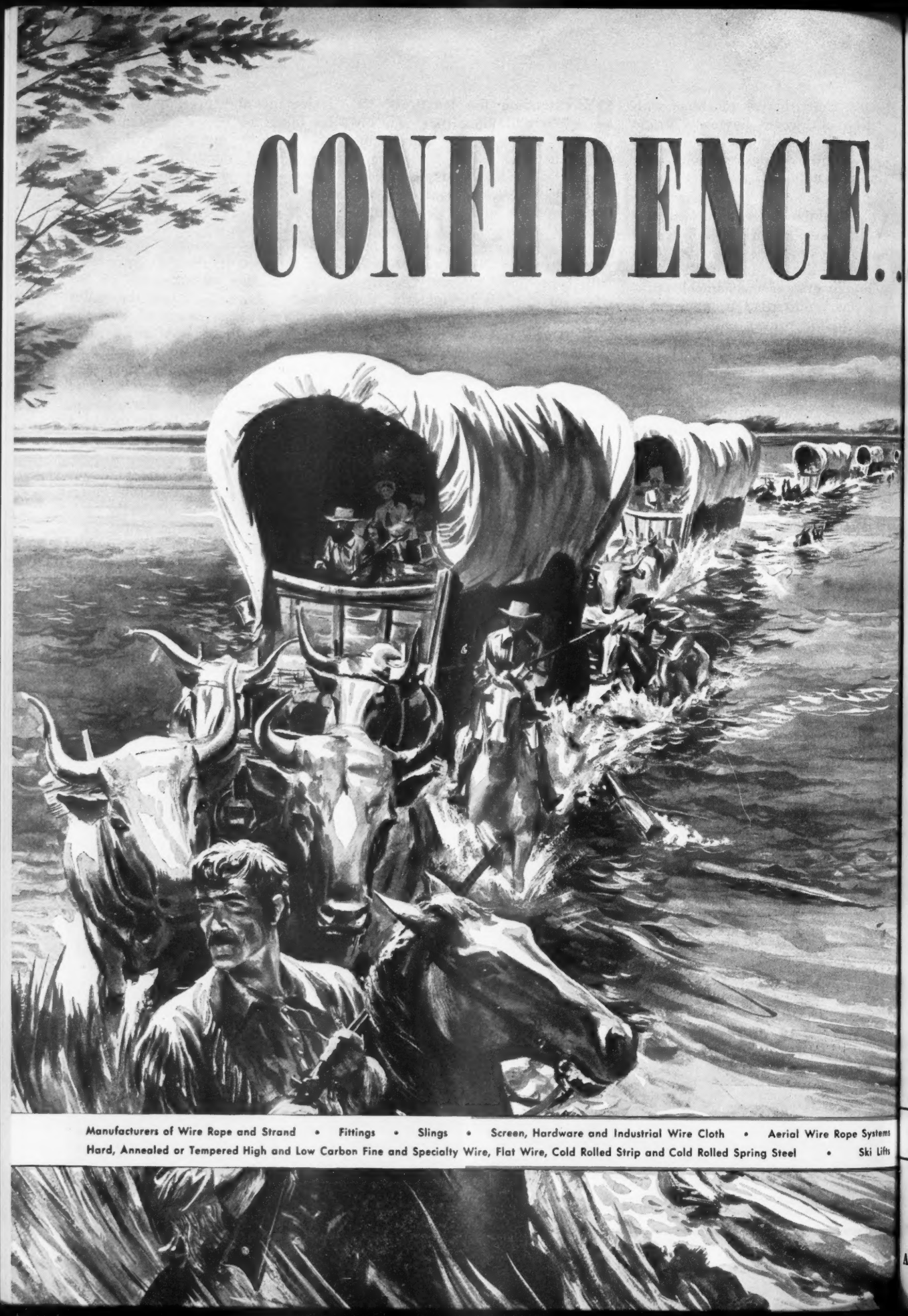


Fig. 4 — Braiding high frequency cable in the Clifton, N. J. plant.



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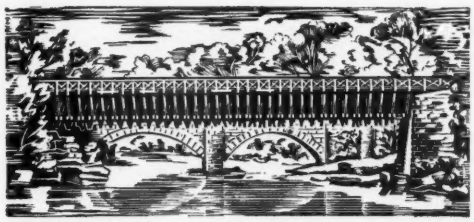

IN 1844, three years before Alexander Graham Bell was born, and long before the first Prairie-Schooner crossed the Mississippi River, John August Roebling's confidence in the suspension principle of construction so impressed the engineers of the State of Pennsylvania, that they authorized him to build the world's first suspension aqueduct.

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ROEBLING

A CENTURY OF CONFIDENCE

Introduction of Aluminum Building Wire Overcomes Copper Shortage — Light Metal Also Found Practical for Other Electrical Cables

ALTHOUGH the copper shortage shows strong evidence of continuing throughout 1947 and perhaps longer according to the copper producers themselves, engineers and construction men concerned with installing electrical circuits will find quick relief through the recent introduction of building wire made with aluminum conductors.

* * *

THE National Electric Code for many years has recognized and approved aluminum for electrical conductors, but, until very recently, the higher current carrying capacity of copper as compared with aluminum has militated against the general use of the latter for insulated wires and cables. Now, however, the electrical wire manufacturers have solved this economic problem by taking advantage of the increased current loadings made possible through the application of modern heat-resisting rubber insulations which can withstand higher temperatures of operation.

* * *

PREVIOUSLY, in the bulk of building wire, the copper conductors have been insulated with Type R rubber insulation rated at 60 degrees C. Now, by protecting an aluminum conductor with Type RH heat-resisting insulation such as Performite (rated at 75 degrees C), there is no need to increase the conductor area since the higher rating of the better grade of insulation fully compensates for the lower current carrying capacity of aluminum (84% that of copper). For example, if an electrician needed a circuit to carry 55 amperes he would normally use a No. 6 copper wire with Type R insulation. Instead, he can use a No. 6 aluminum wire insulated with Type RH heat-resisting insulation and still carry the full current safely. The Hazard Insulated Wire Works Division of The Okonite Company, Wilkes-Barre, Pa., who are now producing and distributing aluminum building wire, advise that there is little or no difference in price between the two types since the higher cost of the better grade Type RH rubber is at least offset by the lower cost of the aluminum. They manufacture aluminum building wire in all sizes to 1,000,000 CM, starting at size 12, and made with standard strandings. All dimensions and finishes remain the same as for ordinary building wire.

While references have been made in WIRE AND WIRE PRODUCTS to the use of aluminum as a substitute for copper in building wire, a recent news item from the company mentioned, seemed to provide fuller information and is published here for the benefit of our readers. Aluminum was more or less forced upon us by the shortage of copper, but it appears likely that due to technological developments, the economic factors remaining equal, aluminum building wire is here to stay.

* * *

HAZARD states that their out put, which had been curtailed by the dearth of copper, has been substantially expanded through the adoption of aluminum as a supplemental source of metal for conductors, enabling heavy backlogs of unfilled orders thus to be reduced and new orders scheduled with shorter delivery promises.

* * *

A detailed technical bulletin H-407 on Aluminum Building Wire has just been issued by the Hazard Insulated Wire Works Division. In addition to tables of capacities, comparative weights and data on characteristics, it includes an insert giving quick methods of determining voltage drop, conductor sizes, circuit length and currents for both aluminum and copper. The bulletin also points out that the fitting manufacturers have developed suitable connectors and terminal lugs for use with aluminum conductors.

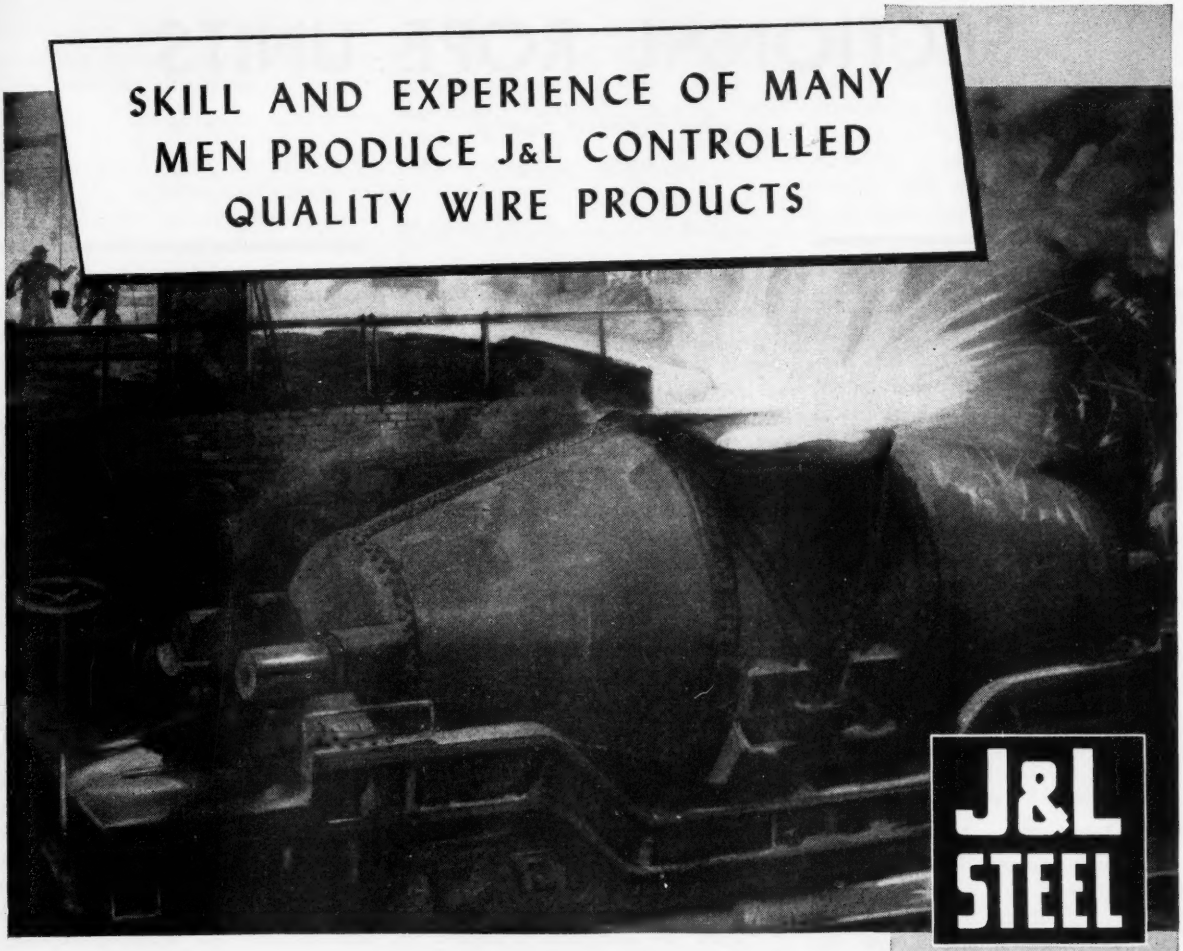
* * *

THE parent company at Passaic, N. J., is also producing aluminum conductors for their custom-built line of electrical wires and cables, partially for power applications. A recently completed order for a large industrial plant, which took advantage of aluminum conductors, included one item alone of 40,000 feet of 500,000 CM low voltage power cable insulated with Okolite heat and moisture-resisting insulation and protected with a bonded covering of Okoprene, made with neoprene. No production problems were reported and the cable, with its light weight conductor, was easy to handle and install.

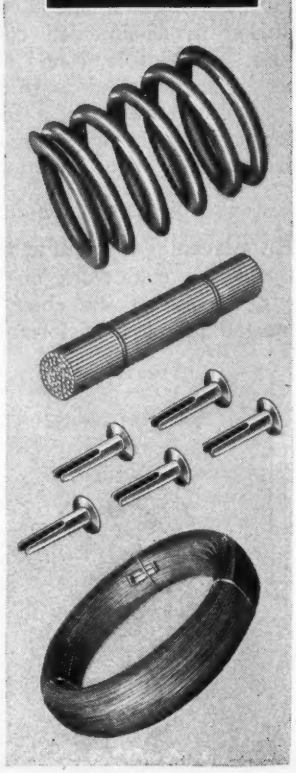
* * *

OTHER applications for aluminum conductors lie in the field of aerial cables where weight savings are more important than in conduit installations. The Company's experience with aluminum dates back over 15 years when ACSR conductors (aluminum conductors steel reinforced) were used in insulated tree wire for long overhead spans.

SKILL AND EXPERIENCE OF MANY MEN PRODUCE J&L CONTROLLED QUALITY WIRE PRODUCTS



The skilled crews of J&L blast furnaces work closely with the men in the mines, the steel works and rolling mills to produce the best iron for J&L Controlled Quality steel. Their combined years of experience, aided by continuous metallurgical research, is an important step in bringing you better, more versatile wire products. As a result of their efforts J&L wire products have a uniform quality that helps make your operations more profitable.



SPRING WIRE ARC WELDING WIRE FORMING WIRE LOCK WASHER WIRE
CHAIN WIRE TUBULAR AND BIFURCATED RIVET WIRE

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

SECTIONAL ROPE UNITS

by Richard Saxton
Sheffield, England

A discussion of the processes of the production of Sectional Rope Units.

THE plastic deformation or cold working of carbon steels to sectional shapes, is a process dependant for successful achievement on the amenable response of metal formation to pressure applied.

* * *

UNLIKE reduction of round sections which, due to uniform incidence of applied forces is more easily achieved, the application of deformation pressure to sectional units, particularly where fabricated from cylindrical material, results in a structure of irregular formation, due to variation in stress applied.

* * *

THE elimination of this defect is easily achieved by suitable heat treatment, but as material in majority of fabrications is required to furnish high tensile stress, its inclusion in as-annealed condition is not practicable, and drafting must be so arranged as to furnish in finishing reductions, a force or deformation pressure uniform as possible over entire reduction area.

* * *

THE percentage of reduction possible by cold work on carbon steels, as one of the chief metals subjected to plastic deformation, is dependant on carbon and manganese content, and higher this content greater the resistance to pressure imposed.

* * *

MILDNESS or extreme ductility is not a ruling factor, as many soft quality steels, and in particular charcoal iron, are too mild to withstand the stress essential to reduce equal percentage per draft as possible with steels of higher carbon composition.

* * *

THIS is due to the lesser resistance to pressure imposed; if drafts are too heavy, they have the effect of stretching the reduced section to a smaller diameter than furnished by reduction die.

* * *

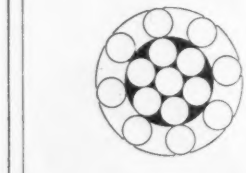


Fig. 1

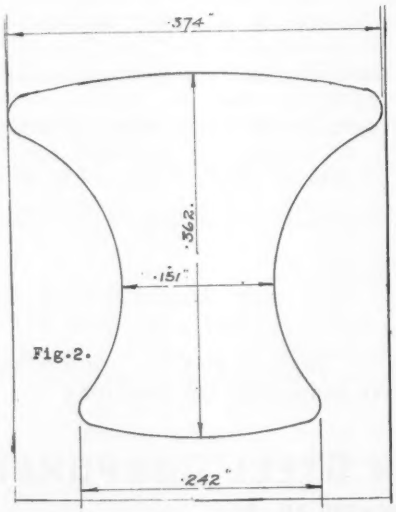


Fig.2.

EFFECT of stretching, in conjunction with reduction, sets up differential stress, only eliminated by prolonged annealing; or with heavy drawn bar material, by machining surface. Employing the machining method, there is always risk of distortion, due to stresses released adjusting themselves to a state of equilibrium on removal of outer skin.

* * *

FULLY three-fourths of carbon steel rods drawn in sectional form are employed in construction of various types of wire ropes, each unit being designed to fulfill some special purpose when incorporated in finished strand or rope. Ropes in which the sectional unit is a prominent inclusion are half and full-locked guide, aerial, and locked coil winding ropes.

* * *

COLD working steels in wire form, certain fundamental changes take place, independent of the percentage of reduction performed. In the first instance original equiaxed structure is transmuted to a tough fibrous material. Concurrently, metal is work hardened and responds less plastically to further pressure. Original grain

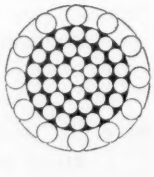


Fig. 3

formation is also fragmented, and crystallites formed tend to orientate in one specific direction.

* * *

DUE to small cross-sectional area of many sections, fabrication to suitable shapes and size during preliminary rolling operation is not practicable, necessitating majority being cold worked from cylindrical formations as the base or commencing material.

* * *

REDUCTION from round form necessitates elimination of fully two-thirds of cross-sectional area with many sections, before desired design is achieved, necessitating frequent heat treatment to eliminate defective stress and hardness imparted.

* * *

GREATEST pressure in the cold working of irregular sections from round material is exerted at certain points to eliminate metal non-essential to efficiency of unit, effect of which is a finer elongated grain structure at these points, with resultant greater hardening and detrimental cross-sectional stress.

* * *

IT is possible, however, to hot roll to shape a few of the larger sections as incorporated in half-lock guide constructions, and general rolling practice is to fashion to a suitable size and design permitting finishing in two drafts .

* * *

FIG. I. illustrates cross-section of an half-lock guide rope in which sectional units, termed rail section have been rolled to shape as described. Finished section as illustrated in No. 2.

* * *

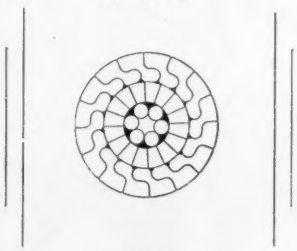


Fig. 4

A smaller type of this section, known to the Shape Trade as H. M., is produced in the following dias.; Top .285; Bottom .217; Centre .120. This size half locks with a round unit .300 dia.

* * *

FIG. 3. illustrates cross-section of an half-lock aerial rope with similar sections in outer layer as previously described, but smaller dimensions. Sections for this construction are produced from higher carbon qualities, to furnish greater tensile stress. As flexibility in this construction is of secondary importance, metal cores are incorporated with all types of fabrication.

* * *

FIG. 4. illustrates cross-section of full lock aerial rope. As will be noted this construction is built round a wire core, one design of section being superimposed on the other to furnish high resistance to stress generated by passage of load or carrier.

* * *

STRESS to which carrier, (aerial), ropes are subjected varies with construction, most pronounced being longitudinal stress, which in the form of "arrested vibrations" is set up by contact with sheaves, and acts detrimentally on rope metal at these points with resultant decrease of elastic limit.

* * *

THIS condition is induced chiefly in locking units, due to greater metal mass in cross-sectional area forming a rigid rod where in contact with sheaves, and acts at these points as a check on any relative movement of unit wires.

* * *

ARRESTED vibrations lead to generation of stress at points of support, and are chiefly pul satory, (repeated loading and unloading in tension and compression). Constant repetition leads eventually to fatigue of units, with subsequent fracture when subjected to stress induced by load.

* * *

PROBABLY the most widely known locking types are the full-lock winding ropes, which strength for strength, are 16.5% less in diameter than strand constructions. Lack of flexibility when first introduced proved a drawback to general adoption, but research and experiment have now overcome this defect.

* * *

FIGS. 5 and 6 illustrate two constructions of locked-coil winding ropes. The outstanding feature of these is the self tightening property of outer layers, which eliminates any tendency to spiralling or slack cover. Even stress under load throughout all layers is claimed for this construction. Due to this feature initial elongation under load is regular and consistent, and danger of fractured units minimised.

* * *

PRACTICALLY all sectional units for locked-coil winding ropes are produced from special acid steel, and are finished to furnish a tensile stress of 95 to 105; 100 to 110; 105 to 115; and 10 to 120 tons per sq. in.

* * *

BULK are produced from cylindrical material, .75 to .80 carbon, and general practice is two full annealings, two shaping drafts, one patenting or tubing, and 3,4 or 5 drafts to finish, dependant on size and stress as per specification.

* * *

ALL reduction or drawing is performed on drums or blocks of the one-draft type, the design of section not lending itself to the follow through of the second draft as possible in multiple drafting of round sections.

(*Please turn to page* 316)

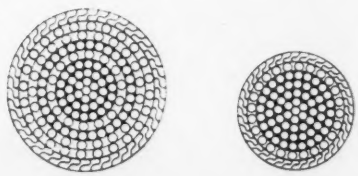


Fig. 5 and 6

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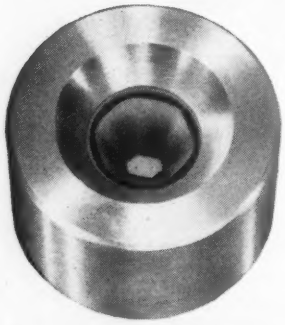
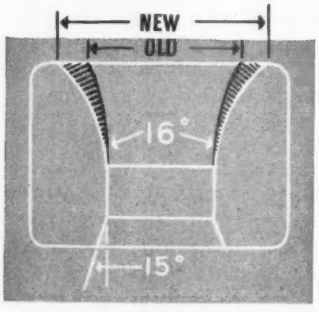
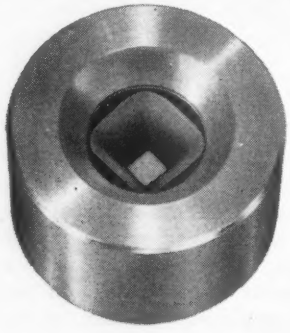


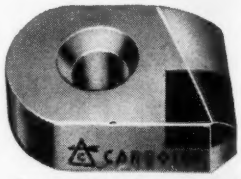




Series "D" Dies (replacing Series "R") have enlarged bell openings. This means internal contours are easier to reach, hence easier to service. It means, too, that you have less stock to remove from the entering angles, which speeds and simplifies servicing. Moreover, the larger bell opening lets the stock carry a heavier coating of lubricant, bringing better lubrication. That's 3 important new advantages to add to Carboloy Dies' many others! Stocked in quantity at Cleveland, Detroit, Pittsburgh, Thomaston (Conn.) and Los Angeles.

Standard Round Dies for Wire and T

Standard Mandrels and Mandrel Nibs



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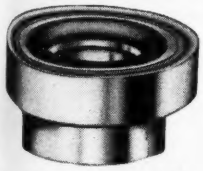

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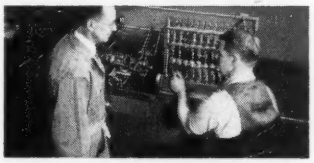

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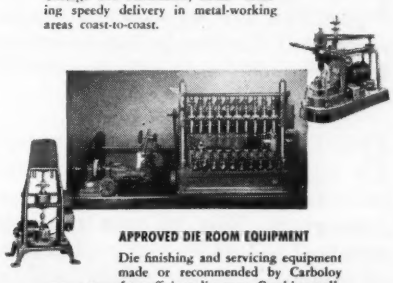

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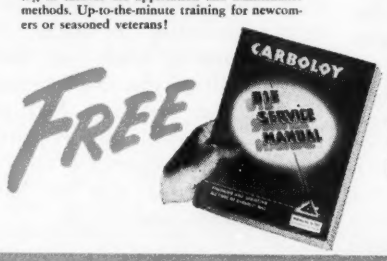

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Preventive Maintenance of Spring Coiling Machines and Some Spring Coiling Experiments

by C. R. Bergevin, Chief Engineer
The Torrington Manufacturing Company
Torrington, Conn.

While spring coiling machines are one of our modern miracles, producing from one machine, by means of appropriate control adjustments, many different sizes and shapes, they are nevertheless not fool-proof.

In this interesting article, Mr. Bergevin describes some production faults that may be encountered and the manner in which the troubles may be run down and corrected — or prevented, if a foreknowledge of their possibility is kept in mind.

The second portion of the article is devoted to the detailing of certain experiments conducted by the Company to find ways and means of increasing the general usefulness and capacity of standard machines.

WIRE springs, made to the extremes of quality and precision, are required by industry today in ever increasing quantities. The reason can be readily understood when we think of the many intricate mechanisms dependent on such springs in our every day life.

* * *

IN the manufacture of precision wire springs, the first important consideration is obviously the selection of wire of uniform temper and size.

* * *

IT is also obvious that a spring produced on an automatic machine will have only the accuracy that the machine is able to impart.

* * *

RESEARCH by the wire manufacturers has produced many excellent results, particularly in recent years. This in turn made it practical to further study all phases of automatic spring coiling, with a view toward further increasing the machine's ability to produce springs of greater precision.

* * *

WHEN that time came, our company undertook an intensified program of research into the operations of the machines, with the result that ways were found to improve in the design to the point where it is now safe to assume that when a faulty spring comes from a machine, the trouble is practically certain to be due either to poor machine maintenance or incorrect setup.

* * *

MANY defective springs may be due to several faults other than the wire. Even if there is only one cause to blame, it may be difficult to trace out. So, after making all of the improvements in design that research had showed to be desirable, our research department concentrated on production difficulties due to faults of maintenance and setup.

* * *

IN doing this research on the operation of automatic spring coiling machines, we used the best quality commercial wire in making high precision springs of various types. Whenever any of the troubles with which spring makers are familiar appeared in the finished springs, our research men traced back through all the various elements of the machine that might conceivably have an influence, until the cause was definitely located.

* * *

IT is the purpose of this article to acquaint the users of automatic spring coiling machines with our findings in a number of cases covering types of spring faults which crop up frequently in spring production but which are generally little understood, with the result that time is often wasted in searching them out, production is lost and product must be scrapped.

* * *

MANY deviations from normal would be of no great importance in springs made to the wide tolerances that were the rule a few years ago. But springs that are to be used in mechanisms in household appliances which are expected to give fool-proof performance for long periods without servicing; or in automotive and aviation equipment on which lives depend, must be precision built to close tolerances.

* * *

THE list of troubles given in this article does not pretend to be complete. But it includes those which crop up often in the day's work, are little understood, and often not easily identified with the cause. Once understood, they are easy to recognize and to rectify or, better yet, to prevent.

* * *

ESSENTIALLY, the operation of an automatic spring coiling machine consists of pushing the correct length of wire by means of friction rollers through confining guides over a stationary arbor against a deflecting tool, usually called a "coiling point", into a coil. The arbor is cut on the end to form an anvil for severing the completed spring from the incoming wire. The pitch or coil spacing is controlled by an adjustable tool located under the first formed coil.

* * *

THE wire feed or length of wire per spring is controlled by an adjustable crank motion operating through a one-way roll clutch, which drives the feed rolls on the segment type machine. It is controlled by timed operation of a friction clutch and brake on the clutch type machine.

* * *

VARIATIONS in spring length may be due to many causes traceable to faulty setup or lax maintenance. It may be, but is not necessarily, the fault of the feed rolls themselves.

* * *

FOR example, it is important for the setup man to select the correct set of change gears for the job. The importance of these gears is not always realized. When an inccuracy in wire length per spring appears, the inaccuracy can be halved by selecting a set of gears which will double the stroke of the segment. Distributing the load in this manner also helps prevent future inaccuracies by reducing the load on the teeth of the segment and so reducing tooth wear.

* * *

TAKE, as an example, the coiling of a spring of .172″ wire, .6″ I. D., five turns, open pitch, squared ends, which takes about 12½″ of wire. On one machine, using the standard feed gears, only three or four teeth of the segment would be used. Because of the heavy wire and small spring diameter, this would cause excessive tooth wear and undue strain on the machine. Had the setup man selected a set of feed gears with less ratio, ten or more teeth of the segment would have been engaged, resulting not only in greater accuracy but less tooth wear and machine strain.

* * *

BY selecting the proper gear set the length of spring made on a given machine can be doubled. As part of every setup, reference should be made to the gearing chart, to determine which set to use for a given feed and wire diameter.

* * *

Exterior view of Spring Coiling Machine

INACCURACIES in wire feed may also be due to movement of the crank gear adjustment block, since the position of this determines the length of wire feed. The setup man should always be certain to lock the adjustment at its proper position.

* * *

IMPROPER maintenance of the one way roller clutch may cause inaccuracies in wire feed that may not be immediately identified with the real cause. The condition of the clutch should always be examined when trouble of that sort arises. Better yet, is to prevent the trouble by proper maintenance as a matter of routine. As in any machine, proper lubrication of the clutch is essential, otherwise it will wear excessively and cause variation in the length of wire feed. Once a month the one way roll clutch should be flushed and cleaned with carbon tetrachloride, and refilled with a few ounces of SAE 10 automotive oil. Do not clean the first time with kerosene as it is apt to create an emulsion which will gum up the parts and prevent their smooth, accurate operation. Excessive cold will, of course, thicken the oil and cause the same effect. When the machine warms up, this condition will disappear.

* * *

BOTH clutch and cams may become worn, especially if the machine has been habitually overloaded. It is well to have spares of both on hand. Preventive maintenance, starting with periodical inspection of the clutches is well worthwhile.

* * *

IF variation in the pitch of the spring appears, it is well to examine the feed rolls for side runout or "wabble", which will cause unequal pressure on the wire. Wabble may be due either to faulty setup or poor maintenance. When setting up, examine the feed roll shaft and bore and both sides of the feed roll collar to make certain that no foreign material such as bits of waste or metal have adhered, which would of course throw the mounted roll out of true. A loose adjustment of the bearing would also cause wabble. Side runout sufficient to pinch the wire in the groove, even to the extent of .002″ on .020″ diameter wire, is enough to cause the pitch to vary.

* * *

IMPROPER pressure of the feed rolls against the wire may affect the accuracy of the spring, by flattening the wire, changing its characteristics, or changing the diameter or pitch of the spring. Excessive pressure can also cause an

appreciable over-loading of the machine which will cause uneven operation resulting in inaccuracies in wire feed and so in the length of the spring. The most obvious cause is using a too-strong pressure on the feed roll spring, which should be the least possible to assure positive movement of the wire without slipping.

* * *

A common mistake is to attribute variations in pitch or length to slipping of the feed rolls. The fact is that rolls do not slip unless the pressure is too slight to uniformly feed the wire into a spring.

* * *

IN setting up for small or soft wire greater flexibily in adjusting the roll pressure may be secured by using a light compression spring under the feed roll pressure hand wheels.

* * *

VARIATIONS in pitch, diameter, and length of spring may be caused by a poor fit between the wire and block wire guide groove. This is because when the groove is too large, the wire will creep up the side of the groove even under comparatively light pressure. That results in change of pitch, which affects the other spring dimensions.

* * *

THE same effect may appear if the coiling point groove is too large. The fit of the wire in the grooves of the other guides is not so apt to cause the trouble, provided the grooves in the block wire guide and the coiling point — those nearest the forming of the coil — are correct. For best results, these grooves must fit the wire diameter within a few thousandths of an inch.

* * *

GREAT care in setting up should be given to the adjustment of the wire guides adjacent to the feed rolls. If there is not sufficient clearance between rolls and guides, the rolls will press on the ends of the guides and therefore will not have enough contact with the wire to push it through the guides uniformly. As a result, this condition will cause the machine to feed wire intermittently or "gallop", causing the same inaccuracies in the springs as too heavy feed roll pressure — namely, variation in length.

* * *

CONTACT between guides and rolls also puts an excessive load on the machine and causes rapid wear of both guides and rolls, which if not quickly rectified will give rise to still further inaccuracies in the finished springs.

* * *

ANOTHER point for the setup man to watch is the adjustment of the block guides. If they are not reasonably snug to the coiling arbor, the result will be the same as those which are the result of using too large a groove in the block guides, namely, inaccuracies in pitch, diameter and length. It may also cause the arbor to break.

* * *

VARIATIONS in spring length are sometimes traceable to carelessness in setting of the pitch tool. Pitch tool movement must always be to the same outward limit. The setup man should check for loose parts or wear by placing an indicator on the tool face and checking the tool's outermost position under actual operating conditions.

* * *

AN important bit of preventive maintenance has to do with the operation of the pitch and diameter lever cams, which must always run true and free. Because the cams bear alternately on each side of the rolls, any wear of the roll stud may contribute to inaccuracy by tipping the cam roll.

* * *

OVERSIZE end coils are common troubles when coiling wide-pitched compresison springs with squared ends. This can be prevented by using the diameter mechanism with barrel spring cams set up to reduce both ends. One cam will usually have to be slightly larger in diameter than the other. The diameter stop screw will nullify the cam action on all but the end coils.

* * *

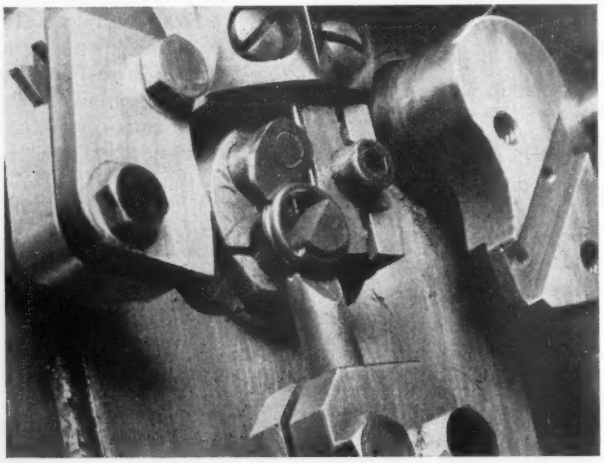
USE of the double diameter control attachment eliminates the necessity of a difference in cam diameters. It also provides an adjustable means for specific control of the oversize end coils.

* * *

THE cases cited in this article — all taken from actual shop problems and traced out in our research department — show clearly how unsafe it is to attribute any particular spring inaccuracy to its most obvious cause. It may be due, as many cases show, to a combination of several. When one of these troubles appears, it is prudent, and in the long run a time-saver, to examine all of the possibilities.

* * *

NONE of them except excessive wear of machine parts caused



Close up showing Forming Tools on Spring Coiling Machine.

by overloading or poor setup, are hard to correct. And all of them can be avoided by preventive maintenance and careful setups.

* * *

Spring Coiling Machine Experiments

THE purpose of these experiments was to find means of increasing the capacity and general usefulness of standard machines. Three experiments, brought to a successful conclusion, are reported herein, many others are in various stages of completion.

* * *

Experiment No. 1

THE purpose of this was to increase the range of spring diameters obtainable from a single machine.

* * *

THE W-11 segment type machine was used. It has a normal maximum capacity of 1.562″ outside diameter of spring. Music wire of .062″ diameter was used. Standard guides, coiling point and .437″ diameter arbor were also required. A special coiling point holder, pitch tool end and cutter were necessary.

* * *

FIGURE 1 illustrates the general arrangement of tools. Note that the cutoff takes place on the second coil leaving one full coil on the machine immediately after wire is cut. The lower cutter shaft was made inoperative by removing the key in its operating gear. It was then pushed against the machine to provide clearance for the spring. In some cases it will be advisable to groove the cutter tool to insure its alignment with the wire to be cut.

* * *

COMPRESSION springs with squared ends, and with open ends, up to 6″ in diameter were coiled successfully, as were rings to the same diameters. Tapered and barrel shaped springs up to 3″ in diameter were also coiled. With these, it was found that the difference in minimum and maximum diameters could not be over approximately 1″.

* * *

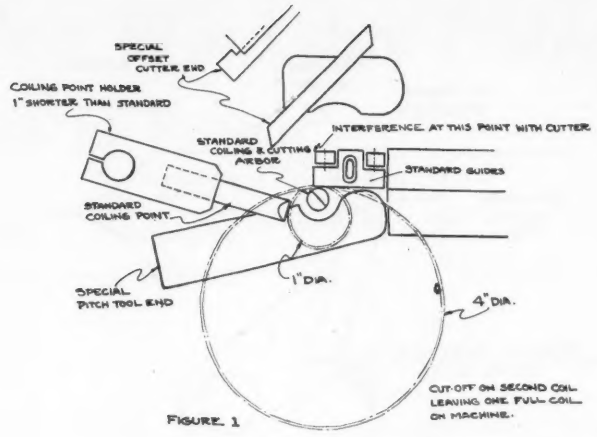

SPECIAL OFFSET CUTTER END
COILING POINT HOLDER 1" SHORTER THAN STANDARD
INTERFERENCE AT THIS POINT WITH CUTTER
STANDARD COILING & CUTTING ARBOR
STANDARD GUIDES
STANDARD COILING POINT
SPECIAL PITCH TOOL END
1" DIA.
4" DIA.
CUT-OFF ON SECOND COIL LEAVING ONE FULL COIL ON MACHINE.

FIGURE 1

Experiment No. 2

THE purpose of this was to find a means for cutting small rigid springs without excessive arbor breakage. The machines are recommended for cutting off springs which do not have less than three times the wire diameter for the coil inside diameter. An example would be .062″ diameter wire formed into .187″ inside diameter springs.

* * *

USING the W-11 size machine, .062″ diameter music wire was coiled and cut into springs having an inside diameter of .125″, with the arrangement shown in Figure 2.

* * *

THE arbor was shaped to leave all possible supporting metal in back of a narrow true coiling diameter. A minimum clearance was left for the pitch tool and cutter. The cutter was shaped to an angle to direct the force line into the heavy portion of the arbor. Figure 2 illustrates this as well as the force line of the standard cutter. The difference can be readily seen.

* * *

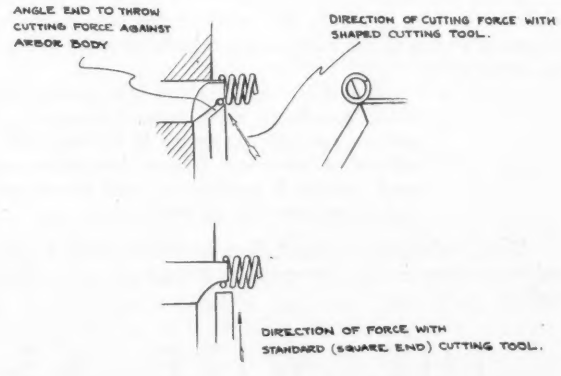

ANGLE END TO THROW CUTTING FORCE AGAINST ARBOR BODY
DIRECTION OF CUTTING FORCE WITH SHAPED CUTTING TOOL.
DIRECTION OF FORCE WITH STANDARD (SQUARE END) CUTTING TOOL.

FIGURE 2

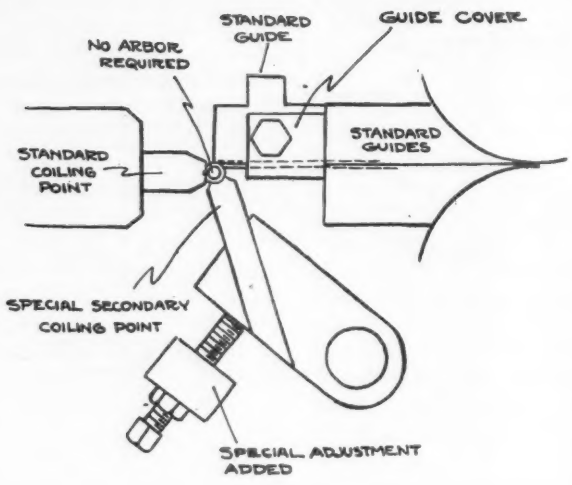


FIGURE 3

THIS method has definite advantages on open pitch springs and in some, although not all closed pitch springs.

* * *

Experiment No. 3

THE purpose of this experiment was to enable the coiling of choke wire casings, or similar small diameter continuous close wound coils, made of relatively large diameter wire. An example would be .062" diameter wire formed into an .080" inside diameter coil.

* * *

COILS of this type have an inside diameter which is too small to make practical use of an arbor for coiling and cutting. Cutting is done by a small press set 10 or 12 feet away from the coiler or by stopping the coiler and using hand operated cutters.

* * *

FIGURE No. 3 illustrates the tool arrangement. The standard wire guides and coiling point were used, with the addition of a standard guide cover. A special secondary coiling point was used in the cutter holder, with a screw adjustment added. The diameter of coil was controlled in the usual manner, that is, by horizontal adjustment of the standard coiling point.

* * *

THE cutter was rendered inoperative by disconnecting its actuating rod. The machine was set for continuous coiling.

* * *

FOR long run jobs, carbide tipped tools are advisable, as well as a solution system using a light water soluble coolant oil.

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Management and Post War Labor Problems as Seen In Britain

by Thos. W. Fazakerley
Chipstead, Surrey, England.

This discussion of post-war labor problems presented from the British view-point will, undoubtedly, be of interest to management throughout the wire industry.

THE recent war time conditions which have been in force for nearly six years, (and are to a very great extent still with the community at large) have during this period presented every employer of labour in the country with many problems. The security and safety of the country depended upon an adequate and efficient response from labour to the many Government Directives on production.

* * *

TODAY the immediate and obvious goal has been reached i.e. Victory. In the struggle for Victory, every individual concerned in the production race gained for himself primarily self preservation. Today Government Directives are still with us and the community even to the extent of self preservation is still from a long term point of view just as vulnerable; but the employer who for six weary years accepted Government control and all the irritations associated with it, now pauses to take stock not so much of the national situation but of his own.

* * *

DURING the years of war a deeper feeling of patriotism naturally permeated the country, and management or labour that in any way endeavoured to gain by the exigencies of the situation was apt to receive short shrift from his fellow men. Today the position has changed, and even in the months since V-day was celebrated, labour has in many cases seemed to the layman to take full advantage of the still present need for production and has struck forcibly at the very vitals of the well being of the community by laying down his tools because a higher rate of pay was abruptly demanded and consequently in some cases as abruptly refused. The fact that this action by labour in so many cases was not condoled by the trade union concerned seems to have had little effect upon the more irresponsible elements of labour. The net result has almost invariably been a cessation of work for weeks, a serious drop in production or of the utility value of the labour involved and eventually (usually after some strong Government warning) the labour involved has returned to work comforted by possibly some promise that the employer and the trade union will get together and come to some reasonable understanding.

* * *

IT would be somewhat invidious at this juncture and in this journal to discuss separate incidents. It must be accepted by everybody that any large strike of labour must in the end have a deleterious effect upon all sections of the community even to the layman who is possibly somewhat divorced from the niceties of labour disputes and is content to take his news from the daily newspaper. It certainly must be a little disconcerting to realise that his own well-being and the well-being of the community in which he lives can be so light heartedly threatened by organized bodies of labour who have the power (and presumably the funds) to issue ultimata that have either to be observed in very quick time or else the consequences are visited upon the heads of the population as a whole. When one bears in mind that such threats (and they are by no means idle threats) took place in war time as well as during the immediate aftermath, one can be forgiven for wondering if the organizers of such strikes really responded to the responsibility they carried. There is certainly no need to commence here to draw any comparison between the man who was called up and saw active service and in so doing probably fought for his very life and the man who by virtue of his trade enjoyed the comparative security of a civilian job in the provinces drawing high rates of pay and knowing little indeed of the dangers or the discomforts of war. What then is to happen in the future?

* * *

HAVE the trade unions sufficient command of labour as a whole to prevent a continuation of such actions that have been witnessed with annoyance and anger during the past years? There is little doubt that the need for production and the need for exporting what we produce is a very real one.

Unless our exports climb, and climb rapidly in all branches of our industry, we shall run the risk of developing an adverse trading balance which in the end must result in our purchasing power as a community becoming less and less until we shall (by virtue of our inability to purchase) become a very much less important power in the world than we are either today or have been in the past.

* * *

IN a democracy such as we have, freedom of speech, thought and action are factors which are of paramount importance: The employee has as much right to act independently as the employer: But surely in times of emergency these rights are curtailed, at least in theory, so that no single section of the community is able to take profit by the situation in which the country finds itself and demand a price accordingly. And yet within six months of the end of the European War the Government has considered it wise to remove controls from a large proportion of employable labour and has announced its intention of extending this beneficent act to a still greater number during the next few weeks. This move might be of considerable value to the community as soon as labour realises that the ultimate prerogative for employing all this massing labour must rest with the employer. Misconduct, particularly in the form of absenteeism and lateness generally, was prevalent in many large organizations throughout the war simply because the Government had at one emphatic swoop deprived the employer of the one means he had always had in the past of preventing such occurrences. During the war it was not possible for the average employer to take immediate disciplinary action against those employees who were regular and in many cases somewhat defiant offenders. The Essential Works Order froze employees quite rightly to certain jobs but at the same time gave them an unlimited degree of permanence and security which enabled those that wished, to take full advantage of the urgency of the situation.

DURING the war Joint Factory Councils and Management Committees were formed. Employer and employee met at the same table and discussed problems which not infrequently were completely outside the ken at least of the employee. But a considerable amount of good was undoubtedly done by these meetings and a number of minor difficulties were smoothed away before they became serious. Even the various Lateness and Absenteeism committees which were so often formed as branches of the local factory council did sterling work. Is it the intention of the Government when wiping out the applications of the Essential Works Order from the industry to ask that these committees of employer and employee who sat in judgement upon workers who were bad time keepers should continue?

* * *

THERE has been quite naturally a sustained hysterical burst in the popular press urging the Government to remove without hesitation all controls. It is scarcely necessary to emphasise how basically unsound such requests are. The need for removal of controls gradually is an accepted fact by all sections of the community but the removal of each control must be preceded by a clear statement of a Governmental policy issued for the guidance of employees and employers.

* * *

IT should not be overlooked that six years of war have drained this country's capital assets to an almost infinitesimal level. Whether the American loan will help us to get on to our feet permanently is a matter of opinion. The granting of it will certainly ease the country's path over the next few years but everything will depend upon the adaptability of the people generally to maintain a production effort which will enable the country to create a reserve to repay this loan on the terms agreed.

* * *

THE granting of the loan and the consequent almost immediate easement of many existing difficulties may in certain circles act as an anaesthetic to those who have struggled and who suddenly find comparative plenty. Apart from the elimination of a physical danger this country has not secured any benefit or advantage as a result of winning the war. Indeed its people are faced with a period of abnormal taxation (direct and indirect) a shortage for years of many commodities (exclusive of food which is in an urgent category by itself) and having been obliged to gradually liquidate its foreign assets finds itself obliged to borrow on comparatively high terms of interest sums and credits which will keep it economically impoverished for many years to come.

* * *

ON the asset value of this dismal picture we have a country that has been stirred to its depths, manned by people who, in one way or another, for the first time in its history have seen and felt throughout its civilian strata the horrors of war and which, if properly led and directed, can give a united effort which will raise a new level of production and maintain an increasingly high standard of technical development and give a wide range of economic production for which the whole of the civilized world, including America, is seeking larger supplies today.

* * *

EVERYTHING, therefore, depends upon the ability of the Government, the Trade Union leaders and the responsible elements of management to secure the degree of cooperation necessary to ensure that production will go on ahead smoothly and, that disputes between management and labour will be handled and contacted through the recognized channels. If this were carried out effectively surely the word "strike" would vanish from our dictionary — but it can only be made effective if there is sufficient good will on both sides to see that both sides of any trade agreement are adhered to, and further, that strong, prompt and

(Please turn to page 314)

GOVERNMENT WIRE PRODUCTION INFORMATION

Report on Nickel Plating Failure

TWENTY-ONE causes of nickel-plating failure and methods of preventing such failure are discussed in a monograph now on sale by the Office of Technical Services, Department of Commerce.

* * *

THE report was written (in English) for the Field Information Agency, Technical, Office of Military Government, by Edmund R. Thews, a German consulting engineer.

* * *

PEELING is still one of the worst problems of the galvanizing industry and one of the most difficult to solve because it arises from many factors, Mr. Thews states.

* * *

"WHENEVER the mechanical properties of the plating, such as tensile strength, hardness, etc., are sufficient to counteract the pulling stresses and the other internal and external forces acting on the film at any one point, peeling is prevented," the report observes. "Where this is not the case, cracking of the film is bound to be induced, especially if the additional force of adhesion is unable to maintain the deposit in its place."

* * *

"COMMON external influences tending to overcome the tensile strength of deposits are bending stresses; cuts or cracks in the film; pores or similar surface faults; inclusions, knots and trees on the surface of the deposits; sharp edges or corners beneath the film, and reduction of the original degree of adhesion by corrosion effects."

* * *

THE report emphasizes the harmful effects on nickel plating of organic and metallic impurities in the electrolytes, hydrogen absorption, excessively high or low hydrogen ion concentration, excessive concentration of organic acts, and faulty degreasing of the base surfaces.

* * *

THE report includes a bibliography of literature on problems related to the peeling of nickel deposits. Many of the articles cited appeared in German and British trade journals.

* * *

ORDERS for the report (PB-47009: **"Notes on the Peeling of Nickel Deposits"**: microfilm, $1; photostat, $2; 24 pages; dated July 1946) should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REG. U. S. PAT. OFF.

MODEL H-T MICRO-WELD HEAVY BUTT WELDER

A general utility Butt welder for welding Steel (low carbon rods and wire ranging in size from 1/8" to 7/8" diameter.

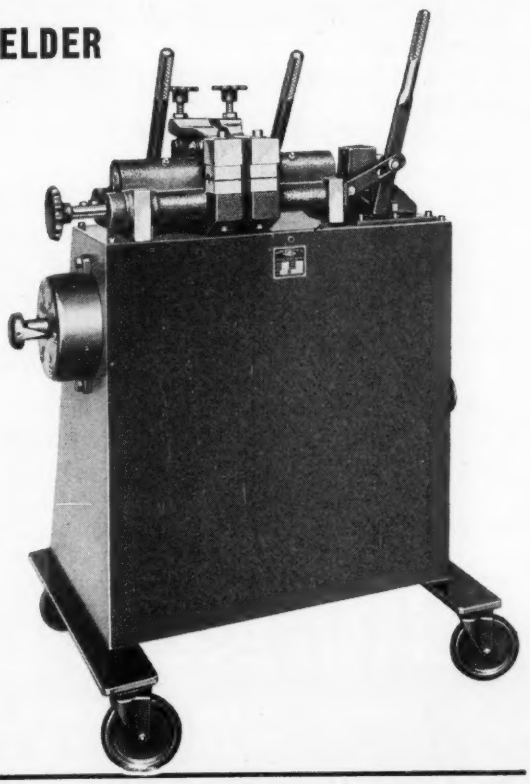
While this unit was not designed for production line work, the wide range in welding capacity make it suitable for various types of welding requirements.

Equipped with hand-operated toggle type clamping mechanism, providing positive clamping of the stock.

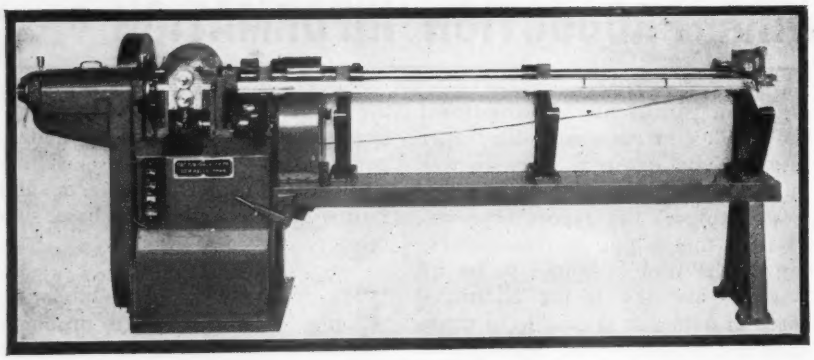
Spring actuated movable welding headpiece and close coupling of the transformer provides high efficiency on the welding current.

General construction of this unit is rugged to resist high upsetting forces, and to maintain accurate alignment of the work.

Furnished mounted on 4-wheel truck as illustrated.



MICRO PRODUCTS COMPANY
20 NOTH WACKER DRIVE
CHICAGO 6, ILL.
Telephone: State 7468



TYPE 1A — CAP. 1/16" to 3/16" DIA.

•

STRAIGHTENER SPECIALISTS
FOR OVER 80 YEARS

Some of the refinements developed in that time—

Almost continuous wire travel
Lightening cut-off that assures square-cut ends.
High-speed, direct-driven 5-die straightening flier
Quiet, efficient V-belt drive
Ball & roller bearings thruout
Extreme rigidity
Types for capacities from 1/32" to 11/16" diameter

[DESCRIPTIVE FOLDER SENT ON REQUEST]

THE F. B. SHUSTER MFG. CO., INC.
3102 Mill River St.
New Haven, Conn.

SHUSTER SINCE 1866
Automatic WIRE STRAIGHTENING AND CUTTING MACHINES

Reports Silver Brazing

CONSISTENTLY strong silver brazes can be produced without detriment to the metal or danger to the brazing operator by using a control flux developed recently by the Navy Department's Bureau of Aeronautics, according to a report now on sale by the Office of Technical Services, Department of Commerce.

* * *

THE composition, properties and experimental development of the flux are described in a report by Lt. A. E. Rising, Jr., USNR, covering a four-month investigation at the Naval Air Material Center, Philadelphia, Pa.

* * *

DEVELOPMENT of a control flux for silver soldering was initiated by the Navy Department shortly before the end of the war. Although much information had been published about properties theoretically desirable in silver brazing fluxes, little quantitative data on specific flux compositions and performance was available prior to the investigation, the report states.

* * *

NAVY Department research workers studied the composition and properties of "Handy Flux", considered representative of most commercial silver brazing fluxes, as a guide to the compounding of experimental control fluxes. Numerous fluxes with slightly varying compositions were formulated and tested.

* * *

THE composition finally selected as a control flux consisted of 50 per cent potassium tetraborate, 30 per cent potassium acid fluoride, 15 per cent potassium fluoborate, and 5 per cent boric acid. This flux was tested by torch brazing, using a commercial silver solder known to present a difficult fluxing problem. The control flux compared favorably with commercial compositions, according to the report.

* * *

THE flux is believed to satisfy all requisites for a standard flux for silver brazing alloys flow-

ing at temperatures up to 1,300 degrees Fahrenheit and, with some limitation in flux film persistence, up to 1,400 degrees Fahrenheit, the report asserts. The flux is therefore considered adequate for the majority of commercial silver brazing alloys.

* * *

THE report includes a summary of some patents on silver brazing fluxes and a table of results in tensile tests of joints made with both the control and commercial fluxes.

* * *

ORDERS for the report (PB-40296: **"Control Flux Composition for Silver Brazing-Navy Specification 51F4"**; photostat, $3; microfilm, $1; 37 pages, including tables and photographs; dated January 1946) should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

Instrument Conference and Exhibit

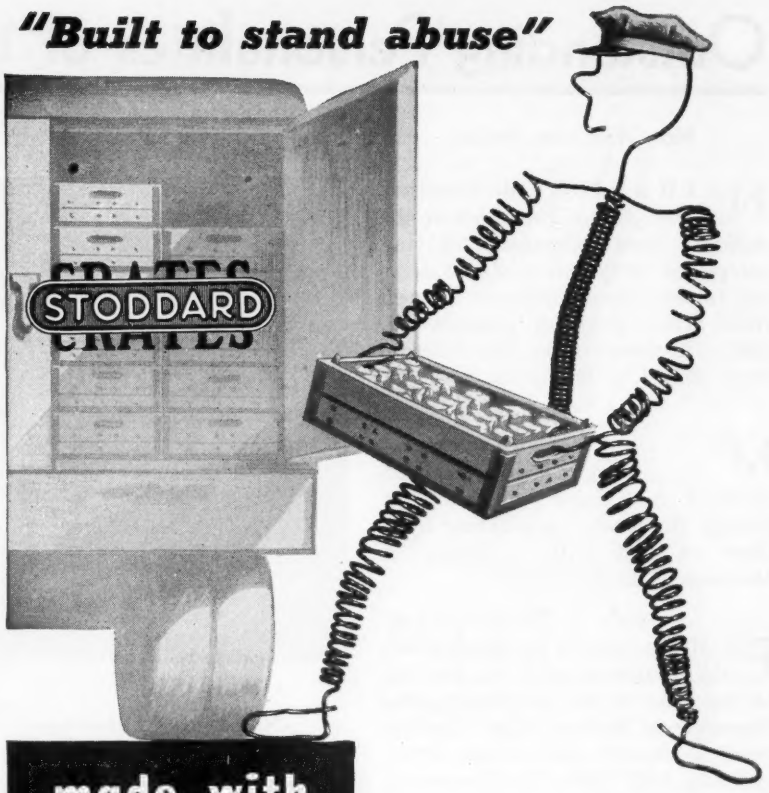
IN connection with the Second National Instrument Conference in Chicago, September 8-12, 1947, the Instrument Society of America will again conduct an Instrument Exhibit.

* * *

THE exhibitors at the 1946 "Show" had a 30 day option on the space in the Stevens Hotel Exhibition Hall. The general sale of exhibit space was announced on February 1st. Information on reservations can be obtained from T. W. Robinson, Chairman of the Exhibit Committee, 236 North Clark St., Chicago 1, Ill.

* * *

THE National Chairman of the Conference Committee is A. F. Sperry, Hubbard Engineering Company, Chicago. The Chairman of the Chicago Committee for the Conference and Exhibit is Hugh Ferguson, People's Gas, Light and Coke Company.

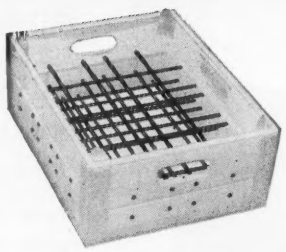


made with
KEYSTONE
WIRE

Stack them to the ceiling . . . jostle them on and off the delivery truck . . . shove them around the restaurants and hotels . . . toss the bottles in and out . . . and Stoddard Milk Bottle Crates will come up smiling. For they're built to "take it" . . . to withstand hard knocks day after day.

Just a glance at the construction will show you why. Steel bound corners are mortised and riveted. Heavy wire dividers, made of Keystone wire, are anchored into the sides and ends. They act as brace-rods, further strengthening the case.

Yes, we are glad that sturdy Keystone wire adds its bit to the fine construction of Stoddard Crates.



Dividers of Keystone wire act as sturdy brace rods

Milk Bottle Crate Co., Chicago 22, Illinois

KEYSTONE
MUSIC SPRING WIRE
KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

SPECIAL ANALYSIS WIRE
for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

Outstanding Personalities of the Wire Industry

Nat Harrison Retires

NATHANIEL Cole Harrison, formerly Vice President of the **Atlantic Steel Company,** having completed forty-two years of service in the steel industry, retired from active duty on January 31, 1947. He remains on the Atlantic Steel Board of Directors, however.

* * *

MR. Harrison was born in Petersburg, Virginia, in 1885 and received his higher education at Lehigh University, graduating from there in 1905 with a degree in Mechanical Engineering.

* * *

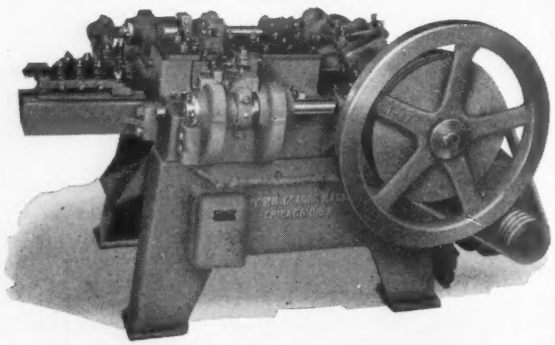
FROM the time of his graduation, the positions held by him up to the time of his retirement are.: Inspector of Rolling Mills, Cambria Steel Company, Johnstown, Pennsylvania, 1905-1908; Chief Inspector, Carnegie Steel Company, Duquesne, Pennsylvania, 1908-1910; Assistant Steam and Hydraulic Engineer, National Tube Company, McKeesport, Pennsylvania, 1910-1912; Steam and Hydraulic Engineer and Superintendent Merchant Bar Rolling Mills, Pittsburgh Crucible Steel Company, Midland, Pennsylvania, 1812-1915; Chief Engineer, Atlantic Steel Company, Atlanta, Georgia, 1915-1916; General Superintendent, 1916-1921; Vice President, Atlantic Steel Company, 1921-1947; Director, Atlantic Steel Company, 1933 to date.

Nathaniel C. Harrison

* * *

WHILE with Atlantic Steel, in 1916, he found time amidst his manifold duties to write a book entitled "Pulverized Coal as a Fuel" and has been actively interested in the Piedmont Driving Club and the Ashley Park Golf Club, of which he is at the present time the president.

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS

210 No. Racine Ave.
Chicago 7, Illinois

IN his own organization, Nat was loved by everyone and those closest to him loved him most and miss him keenly. His integrity, his sympathy and understanding, his faith in his fellow-man and the stabilizing influence of his character, leave a gap in the Company that will be hard to fill. He was considered a "swell fellow" by his co-workers, in the fullest and finest sense of the word.

* * *

MR. Harrison is well and affectionately known in wire circles and for many years has taken an active part in the work of The Wire Association, of which organization he has served as Director for three terms. He will be missed at the conventions, but will be most cordially welcomed any time that he feels the urge to return to visit with his numerous friends.

* * *

Inco Development and Research Division Promotions

DR. **William A. Mudge** has been appointed Director of the Technical Service Section of the Development and Research Division of **The International Nickel Company, Inc.**, and **William F. Burchfield,** Assistant Director, **T. H. Wickenden,** Manager of the Division, announced. Formerly Assistant Director, Dr. Mudge succeeds **O. B. J. Fraser,** who recently was made Assistant Manager of the Development and Research Division.

* * *

DONALD J. Reese, while continuing to head the Iron and Non-Ferrous Casting Section of the Division, will also be in charge of its Field Sections. The latter position was formerly under the direction of **H. J. French,** who was recently appointed Assistant Vice President of International Nickel.

* * *

MR. Wickenden also announced that the various units of the Division's Steel Section are now headed by the following **J. W. Sands,** Engineering Steels; **Dr. V. N. Krivobok,** Stainless Steels; and **T. N. Armstrong, Jr.,** Railway and Cast Steels.

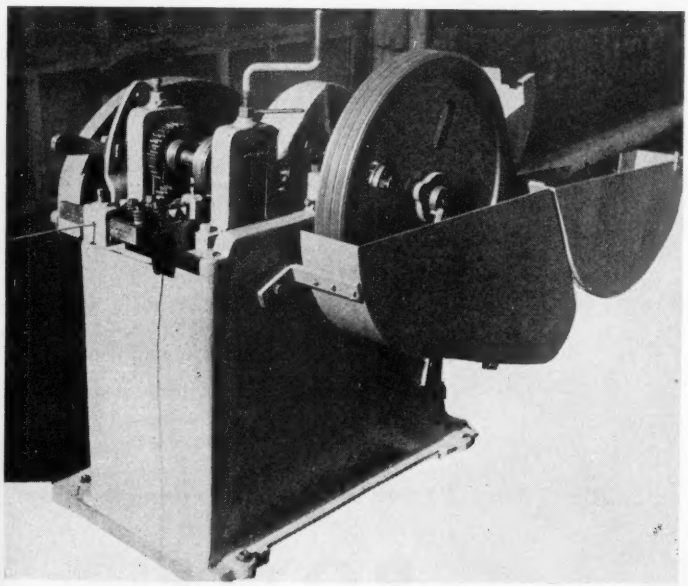
Thomas F. McLaughlin

THOMAS F. McLaughlin, 55, president of Eastern Stainless Steel Corp., Baltimore, died suddenly at his home in Baltimore on Feb. 10. He was elected president and general manager of the Eastern Rolling Mill Co., predecessor to the Eastern Stainless Steel Corp., in 1944. Previous to his affiliation with the Eastern company, Mr. McLaughlin had been assistant to the president of Crucible Steel Co. of America, New York, and prior to that, vice president of Rustless Iron & Steel Corp., Baltimore.

* * *

Alexander L. Feild

ALEXANDER L. Feild has been appointed associate director of research laboratories, **American Rolling Mill Co.,** Middletown, O. He had been director of research laboratories of the Rustless Iron & Steel Corp., prior to that company's affiliation with the Armco organization.



HERE IT IS!

THE HUMPHREY RAPID FENCE STAPLE MACHINE

CUTS FENCE STAPLES 5/8" to 1 5/8", 900 TO 1000 PER MINUTE, UNIFORM IN SIZE, EVEN LEGS, CLEAN SHARP POINTS.

Also makes, with Attachments, Poultry Netting Staples and Double Pointed Tacks.

MANUFACTURED EXCLUSIVELY

for

REED and RICHARDS TRANSATLANTIC, INC.

CHANIN BLDG., 122 EAST 42nd ST., NEW YORK 17, N. Y., U.S.A.

REG. CABLE ADD.: "LOUREED, NEW YORK".

Wire Bale Tie Machines — *For export only: Double-Gear Windmills & Pump Jacks*

Affiliated Manufacturing Companies Dept. Established by General Electric Company

THE **General Electric Company** has established an Affiliated Manufacturing Companies Department, and appointed Vice President **L. R. Boulware** as general manager. **E. J. Harrington** has been appointed manufacturing manager of the new department, and **Roy W. Johnson** marketing manager.

* * *

MR. Boulware, who had been vice president on the president's staff, joined the General Electric Company following his wartime service with the War Production Board. Previously he had been vice president and general manager of the Celotex Corporation, Chicago.

* * *

MR. Johnson was vice president in charge of sales for Telechron, Inc. During the war he was with the War Production Board, serving as director of the Facilities Bureau. Before the war he had marketing assignments with Schick, Inc., and General Electric.

* * *

MR. Harrington has been on the staff of Mr. Boulware since October, 1945. During the war he was vice president of the Curtiss-Wright Corporation, and previously had been a manufacturing executive and industrial engineer and a general executive in the aircraft and automotive fields.

* * *

THE manufacturing affiliates include Carboloy Company, Inc., General Electric X-Ray Corporation, Hotpoint, Ins., Locke Insulator Corporation, The Monowatt Electric Corporation, Telechron Inc., and the Trumbull Electric Manufacturing Company.

* * *

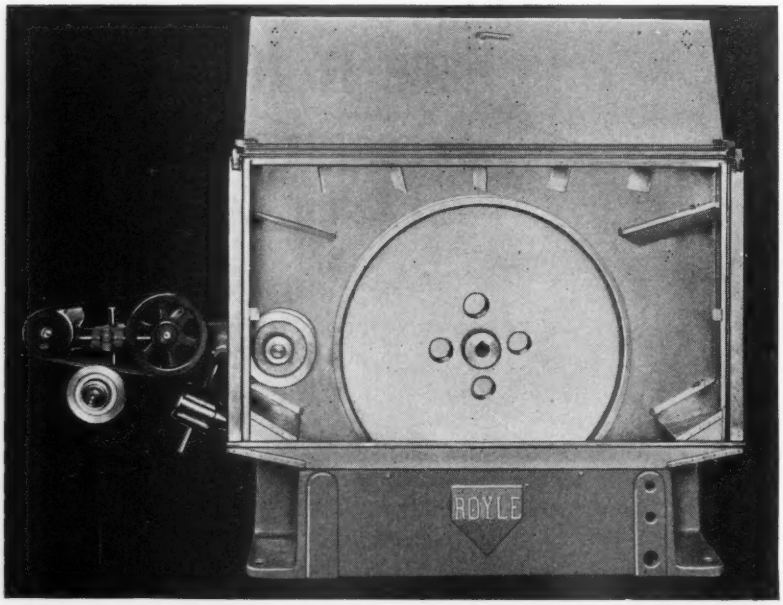
ALSO **Frank W. Warner**, Jr. engineering manager of the General Electric plastics divisions for the past three years, has been named engineering policy manager of the company's Chemical Department, according to announcement made by **Dr. Zey Jeffries**, G-E vice-president and general manager of the department. Mr. Warner will be responsible for the coordination of all engineering and laboratory activities of the department and will have his headquarters here.

* * *

MR. Warner has been associated with General Electric since July 1929 when he became a student on the Test Course in Schenectady. He entered the Advanced Course in Engineering in the fall of 1929. In the spring of 1930 he transferred to the Engineering General Department and came to the Plastics Division in 1931 on an assignment in the chemical section of the Research Laboratory in Schenectady.

Brown Co. Promotes Schmitt, Pyle and Roat to New Posts

HENRY M. **Schmitt** has been named chemical industry manager of the Brown Instrument Company, Philadelphia. **O. B. Pyle** has been made industrial manager of the



The Royle 36″ High Speed Capstan for Resin Insulated Wire

- Stainless steel watertight enclosure
- Total enclosure permits higher wire speeds
- More efficient wire puller stabilizes wire speed
- Secondary idler pulleys guide wire across capstan preventing rubbing and permitting larger quantities to be cooled simultaneously
- All bearing located outside of enclosure to prevent contact with water
- Quiet running
- Built-in air wiper

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England — James Day (Machinery) Ltd. — REgent 2430
Home Office — E. B. Trout J. W. VanRiper — SHerwood 2-8262
Akron, Ohio — J. C. Clinefelter — JEfferson 3264
Los Angeles, Col. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

Philadelphia area and **A. W. Roat** is now industrial manager of the St. Louis branch of the industrial division of Minneapolis-Honeywell Regulator Company.

* * *

THE sales executive staff changes were made known by W. H. Steinkamp, field sales manager for Brown. At the same time Mr. Steinkamp announced that **I. K. Farley** has been placed in charge of the major petroleum accounts in the Philadelphia area and **Harry D. Ruch** will also work out of the industrial sales division at Philadelphia.

* * *

Du Pont Appointment Announced

W. **A. Joslyn,** director of sales for the Du Pont Plastics Department, announced recently the appointment of **W. D. Maginnes** as sales manager of the nylon monofilament section, succeeding **W. W. Perry** who is retiring March 31.

* * *

MR. Maginnes, a member of the company's plastics sales department for the past 27 years, has been a special sales representative assigned to nylon monofilaments since 1942. He joined the Plastics Department at Arlington in 1920 as a technical representative of the "Pyralin" division and has served in various sales capacities, working out of the department's offices in the Empire State Building, New York, during most of the intervening years.

Entwistle Appoints New Superintendent

THE **James L. Entwistle Co.,** Pawtucket, Rhode Island, manufacturer of spark-testing equipment, has appointed **Douglas T. E. Foster,** recently released from active duty with the U. S. Maritime Service, as General Superintendent in charge of all production operations.

* * *

MR. Foster attended Brown University where he majored in Engineering, and is a graduate of the U. S. Naval Torpedo Station Apprentice School, Newport, R. I. Prior to being assigned to active duty in the U. S. Maritime Service, Mr. Foster was successively a research machinist for the U. S. Naval Ordnance Dept., a Department Head and Instructor of mathematics and machine shop theory and practice at the U. S. Naval Torpedo Station Apprentice School. While in the service, Mr. Foster was successively an engineering officer aboard a U. S. Maritime Service Transport Vessel and an engineering training officer at U. S. Maritime Service Training Stations.

Colorado Fuel & Iron Appointments

JAY J. **Martin** has recently been appointed works manager of the Pueblo plant of Colorado Fuel & Iron Corp., Denver. He began his work with CF&I in 1926 at Pueblo as assistant openhearth superintendent. **Rudolph Smith** has

WEAN EQUIPMENT Corporation

THE WEAN EQUIPMENT CORPORATION are recognized as specialists in high-efficiency strip and wire mill equipment.

COLD ROLLING MACHINERY

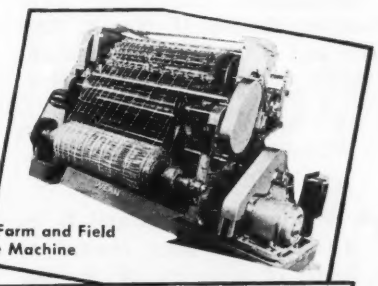
For 36" Wide Material and Narrower

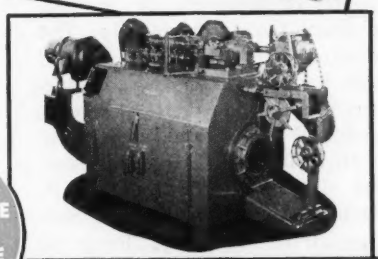
MILLS · REELS · SLITTERS · LEVELERS
COILERS · EDGERS · SCALE BREAKERS · SHEARS
SCRAP BAILERS · CONTINUOUS PICKLING

WIRE MILL EQUIPMENT

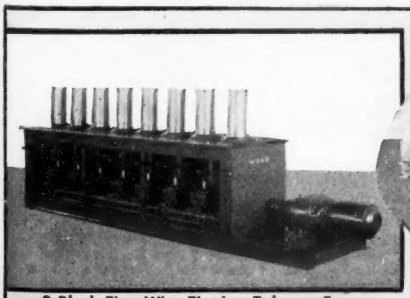
WIRE DRAWING MACHINES · PATENTING
GALVANIZING AND TINNING TAKE-UP FRAMES
WIRE FLATTENING · SPOOLERS
NAIL GALVANIZING AND BLUEING FIELD FENCE and BARBED WIRE MACHINES

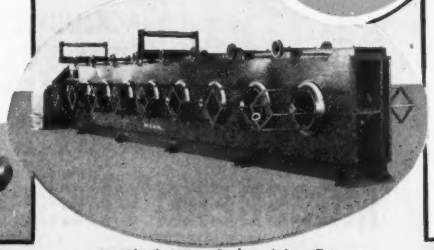
WEAN EQUIPMENT CORPORATION
22800 LAKELAND BLVD • CLEVELAND, OHIO

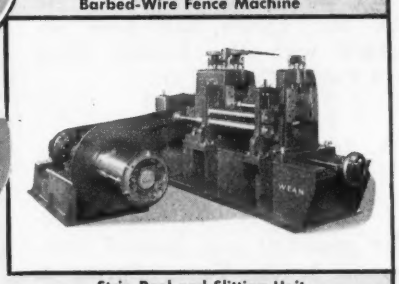

No. 1155 Farm and Field Fence Machine


Barbed-Wire Fence Machine

HOLMQUIST BARBED WIRE and WIRE FENCE MACHINERY


8 Block Fine Wire Tinning Take-up Frame


16 Block Wire Galvanizing Frame


Strip Reel and Slitting Unit

been named superintendent of the openhearth department and **W. B. Jacobson** has been appointed superintendent of rolling mills and finishing department. Mr. Jacobson has been with CF&I since 1940. **William Meredith** has been appointed superintendent of Pueblo wire mill. He came to CF&I in 1902, left in 1903 to work for the Morgan Construction Co., but returned to the Pueblo plant in 1904 as master mechanic of the wire mill. In 1920 he was appointed assistant superintendent.

Reliance Advances Harrell

FRED E. Harrell, General Works Manager and a director of **The Reliance Electric & Engineering Company,** has been elected Manufacturing Vice-President of the company, it was announced recently by **J. W. Corey,** President, following a meeting of the Board of Directors. All other officers were re-elected. In addition to Mr. Corey, they include Clarence L. Collens, Chairman of the Board; Edward E. Helm, Sales Vice-President; P. G. McAusland, Comptroller and Treasurer; Roscoe H. Smith, Secretary; and H. E. Walters, Assistant Secretary and Assistant Treasurer.

Atlantic Steel Company Appointments

DR. Wadley R. Glenn and **R. S. Lynch** have been elected to the board of directors of the Atlantic Steel Co., Atlanta, Ga. The following officers have been elected by the board: **Charles F. Stone,** chairman of the board; **R. S. Lynch,** president; **W. F. Glenn,** vice president; **H. B. Johnson,** vice president; **Gilbert Purvis,** treasurer; **J. N. Goddard, secretary;** and **M. C. Sarran,** assistant secretary. Prior to joining the Atlantic Steel Co. in 1944, Mr. Lynch had been associated with the United Alloy Steel Corp., Canton, O.

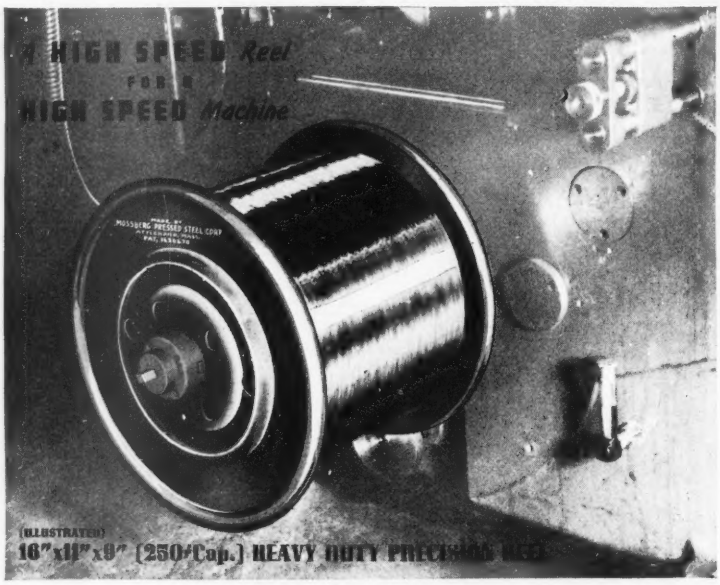
L. A. Young Spring & Wire Corp. Appointments

N. D. Ely has been elected vice-president and general manager of **L. A. Young Spring & Wire Corp.** of Chicago. Mr. Ely has been in charge of manufacturing since 1943 and was promoted to fill the vacancy created by the death of C. M. Young. **Thomas Couper,** general sales manager, and **Grant L. Cook,** general counsel, have been elected to the board of directors of the same organization.

Stainless Steel Corporation Appointments

JOHN M. Curley has been elected president and **Lachland Mackenzie,** a vice-president of **Eastern Stainless Steel Corp.** of Baltimore. Mr. Curley, who succeeds the late Thomas F. McLaughlin as president, is also chairman of the board of the corporation, and president of the subsidiary, Industrial Steels Inc. of Cambridge, Mass. Mr. Mackenzie was previously assistant treasurer and comptroller of Eastern Stainless Steel.

SEND IN
YOUR ORDER NOW
for the
1947 WIRE BUYERS GUIDE



MOSSBERG PRESSED STEEL CORP.

OFFERS: BALANCED PRECISION REELS

in HEAVY DUTY construction for use on modern HIGH SPEED wire drawing machines.

To provide higher operating efficiency, with the ever increasing tendency towards the drawing of finer gauge wire on larger reels at higher speeds, the following reel requirements are now essential:

(1) PROPER PROPORTION
(2) BALANCE
(3) ACCURACY
(4) STRENGTH
(5) DURABILITY

All these requirements are incorporated in spools & reels made by

MOSSBERG PRESSED STEEL CORP.
18 WEST STREET ATTLEBORO, MASS. U. S. A.

A Review of Recent Wire Patents

No. 2,415,078, PROCESS FOR CHROMING STEEL ARTICLES, patented February 4, 1947 by Gottfried Becker, Buderich, near Neuss, and Karl Daeves and Fritz Steingerg, Dusseldorf, Germany; vested in the Alien Property Custodian.

For the production of steel articles with corrosion-resistant surfaces by thermal diffusion of chromium into the surfaces, the inventors manufacture the articles to be chromed from alloys of iron containing carbon in significant amounts but less than 0.2%, chromium 0.5 to 5%, vanadium 0.3 to 3% and then chrome the articles made of these alloys by such diffusion.

★ ★ ★

No. 2,415,228, GARMENT HANGER, patented February 4, 1947 by Everett L. Whenham, New York, N. Y.

This is a skirt or trousers hanger, constructed of a single length of wire along relatively simple lines.

★ ★ ★

No. 2,415,582, ELECTRICAL COIL AND METHOD OF MAKING SAME, patented February 11, 1947 by Edward C. Earhart, Cranford, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

An electrical coil is provided, comprising a support for a winding and a multilayered winding of a conductive wire strand on the support, in combination with a binding tape disposed radially at one end of the winding and passing sinuously around and between radially superimposed turns of consecutive layers of winding in alternately oppositely facing loops.

★ ★ ★

No. 2,416,394, METHOD OF MAKING FIBER INSULATED WIRE, patented February 25, 1947 by Christopher J. Krogel, Cranford, N. J., assignor to Western Electric Company, Incorpoarted, New York, N. Y., a corporation of New York.

★ ★ ★

No. 2,416,048, SHIFTABLE WORK SUPPORT FOR MACHINES WHICH STRAIGHTEN TUBES OR BARS, patented February 18, 1947 by David William Thomas Evans, Sutton Coldfield, England, assignor to T. I. (Group Services) Limited, Birmingham, England.

The assembly comprises a pair of spaced anvils for supporting the work piece in a working position, a pair of horizontally movable slides situated at opposite sides of the anvils and adapted to move the work piece into and out of a position above the anvils, springs carried by the slides and supporting arms and also adapted to support the work piece near its ends, a device to be brought into action under the control of the operator for raising the slides at least in part to enable them to clear the anvils during the horizontal movements of the slides.

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

★ ★ ★

No. 2,416,477, POCKET CLIPPING KEY HOLDER, patented February 25, 1947 by Homer Gamache, N. J., assignor to Acme Metal Goods Manufacturing Co., a firm composed of August C. Fischer, Charles F. Fischer and Harry F. Fischer, all of Newark, N. J.

Aside from the individual key clips, this holder is of a single length of wire.

★ ★ ★

No. 2,416,561, COMBINATION ELECTRICAL AND FLUID CONDUCTING CABLE, patented February 25, 1947 by Frederick G. Albin, Los Angeles, Calif., assignor to Radio Corporation of Amerıica, a corporation of Delaware.

This cable comprises a flexible wire hose, a braided copper electric conductor about the hose, a layer of resilient air and water tight material surrounding the conductor, a textile wrapping interposed between the conductor and the layer of resilient material, a primary insulation of braided material having a low loss factor at high frequencies surrounding the resilient material ,a second braided electrical conductor surrounding this insulating material and the resilient material, a textile wrapping on the second conductor and an outer insulating jacket about the wrapping.

DIAMOND POWDER FOR THE DIE ROOM

UNWIDIE

We at UNION WIRE DIE are specialists in dies and all things related to them. Diamond powder is no exception.

A quarter century's experience in working with diamond and alloy dies have proven what the particle-size limits of various grades of diamond powder should be to produce maximum production and highest polish in manufacturing and recutting all types of dies.

The method of grading used GUARANTEES absolutely uniform particles within the grade limits, and only the finest quality diamond boart is used.

Add all these factors to the reputation of UNION for selling only the finest, and you have a diamond powder which will open new horizons for your die room.

DIAMOND DIES

DIAMOND POWDER RECUTTING MACHINERY

THE UNION WIRE DIE CORP.

71 West 45th St., New York City 19

375 Fairfield Ave. Stamford, Conn.

Big Thy-mo-trol Drive is Installed on Wire-drawing Machine

THE largest G-E Thy-mo-trol drive ever installed, and the first of its kind to be applied as the main drive for a wire-drawing machine, is now in operation on a multi-pass wire-drawing machine used to draw copper and brass wire at the **Scovill Manufacturing Company's** plant in Waterbury, Conn. The control, which uses sealed-ignitron tubes for the armature power supply instead of the usual thyratrons, operates a 40-hp, 230-volt, adjustable-speed motor.

THE wire-drawing machine has 16 dies, four drawing-roll spindles, and a block for coiling the finished wire. The wire is brought into the machine from a loose coil. After passing through one die, it is given several turns around one step of the cone, and is then passed through the next die to the opposite spindle. It passes back and forth between the spindles, each time passing through a die, and always passing to a roll having a larger diameter. Thus the elongation of the wire is taken up by higher speed steps. The wire pases from the final die to the block, which winds it in a coil.

* * *

THE drive gives wide range of speed control to obtain maximum production of a given size of wire. A speed range of from approximately 60 to 690 rpm is provided by means of armature-voltage control, and from 690 to 1380 rpm by means of field control. Jogging speed can be adjusted by means of a separate control potentiometer from about 60 to 690 rpm. Constant speed is held for a particular speed setting regardless of load. This is especially desirable for the jogging operation required to thread the machine, because when the first die is threaded, the motor is operating under a very light load; when the last is threaded it is delivering approximately full load.

* * *

CURRENT-LIMIT control of acceleration eliminates the current and torque peaks common to other methods of starting, and thus minimizes wire breakage. Other features of the drive include rapid acceleration, dynamic breaking, and overload protection of the motor.

NOTICE TO SUBSCRIBERS

regarding the

WIRE & WIRE PRODUCTS BUYERS GUIDE AND YEAR-BOOK OF THE WIRE ASSOCIATION

The 1947 Edition of this useful directory may be obtained by subscribers at 40% discount from the list price of $5.00 per copy. So when ordering your subscription to WIRE and WIRE PRODUCTS, if you want a copy of the BUYERS GUIDE, please enclose $3.00, or send the order and ask us to bill you.

Members of The WIRE ASSOCIATION will continue to receive a copy of the BUYERS GUIDE as part of the service extended to them, and the cost is included in the dues.

To all others the price remains as heretofore $5.00 per copy.

THE BUYERS GUIDE is a complete directory of all kinds of wire and wire products manufactured in the country, together with listings of all machinery, equipment, supplies and services used by the Wire Industry.

It is an invaluable source of information on everything of interest to wire men. Be sure to order your copy early to be certain of getting one, as the edition is limited. Published in the Spring annually... Only $3.00 to subscribers.

WIRE and WIRE PRODUCTS

300 MAIN STREET **STAMFORD, CONN.**

Y. & T. to Build New Plant

ANNOUNCEMENT has come from the Executive Offices of the **Yale & Towne Mfg. Co.** regarding the financing and placement of contracts for a new plant in Philadelphia of more than 600,000 square feet on a 93-acre plot. In the plant will be produced the various hoists, hand lift trucks, electric trucks, cranes, and other equipment manufactured by the Materials Handling Division of Yale, presently located at 4530 Tacony Street, Phila.

* * *

THE new quarters will accommodate 3,000 employees on a single shift, some 900 more than are currently working on two shifts; the expanded plant capacity will permit quicker delivery of materials handling equipment to users.

New Line of Standard Shape Dies Announced by Carboloy Company

TO allow greater altitude in the angle at which stock may enter the dies; to permit faster die finishing and servicing; and to provide more lubrication of both dies and stock, **Carboloy Company, Inc.**, of Detroit, Michigan, has placed on the market a new line of standard square and hexagonal shape dies that have larger bell openings than previously. The dies are so designed that they may be finished to cover a range in hole sizes from 5/32″ to 1-5/8″ for the square dies and from 5/32″ to 1-7/8″ for the hexagonal dies.

* * *

THE enlarged bell opening in the new dies permits the stock to enter the die carrying an even heavier coating of lubricant than was possible with previous dies. Thus, more effective lubrication of both die and stock is accomplished. The enlarged bell also reduces the amount of extraneous stock which must be removed from the entering angles of the die when making up a finished die from the rough shaped die. In adition, the design of the new dies allows readier access to the internal die contours which materially adds to the case and quickness with which the dies may be finished and serviced. However, both finishing and maintenance is performed in the same manner and with the same equipment as for the previous dies.

* * *

THE new dies are known as Series "D", and replace the former "R" line of Carboloy shape dies.

Freeport Sulphur Acquires Assets of Tainton Estate

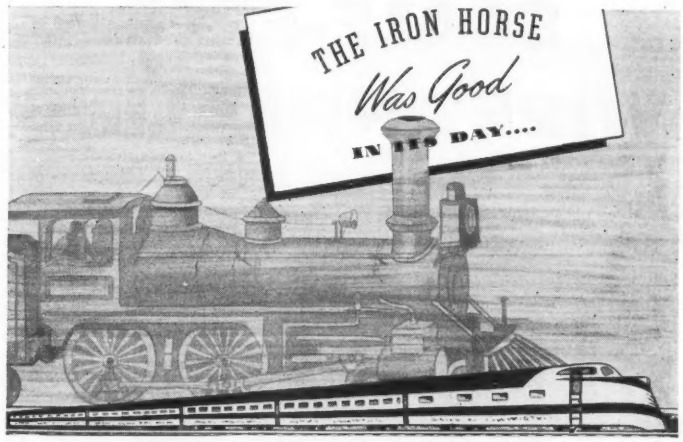
FREEPORT Sulphur Company has acquired assets of the estate of the late **U. C. Tainton**, metallurgist and inventor, and will carry on research and development work at the Tainton laboratory in Baltimore, **Langbourne M. Williams, Jr.**, president, has announced.

THE assets, acquired as part of Freeport's expansion program, includes various processes, products, inventions, domestic and foreign patents and laboratory facilities. Laboratory operations will be continued by the present technical staff as a new division of Freeport, to be called Tainton Products Company, under the direction of Charles D. G. Breckinridge, manager.

* * *

MR. Tainton, who died in 1945, was the inventor of the so-called Tainton process for production of electrolytic zinc, of electrogalvanizing of steel products, of metal cleaning processes and of various other processes and products.

ADVERTISING is a service to a magazine's readers. Methods, materials, and machinery were developed under the stress of war. Both editorial matter and advertisements keep you informed on what is happening in industry.



BUT...

No up-to-date time-table would accomodate its picturesque but unbusinesslike progress. Now, in all forward looking industries, the emphasis is on positive results. For example,

CHEMICALS ACP PROCESSES

RUST PROOFING AND PAINT BONDING
Granodine
Duridine
Alodine
Lithoform
Thermoil-Granodine

RUST REMOVING AND PREVENTING
Deoxidine
Peroline

PICKLING ACID INHIBITORS
Rodine

Cuprodine *

is designed to boost and improve production in the drawing of wire, tubing, etc. Cuprodized steel is cupro-lubricated with a thin and adherent layer of copper that reduces scratching, increases die life and thus promotes greater linear footage of drawing per die. And CUPRODINE, can be applied in a simple immersion process without current.

CUPROTEK* passivates Cuprodized or solid copper surfaces and acts as a paint bond or a good temporary preventive of corrosion.

* Trade Mark Reg. U. S. Pat. Off.

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Stainless Steel Used for Telephone Cable Suspension

STAINLESS steel spinning wire for telephone cable suspension in highly corrosive atmospheres has just been introduced by a mid-western manufacturer of cable spinning equipment.

* * *

IT is said to assure substantial savings — lasting from 3 to 5 times longer than heavily coated wire formerly used where corrosive conditions are severe.

BESIDES the savings gained from stainless wire, manufacturers say installation costs are cut 20% by the lashed method of telephone cable suspension. In this method of spinning, the telephone cable is tightly lashed to the supporting strand by means of helically wound wire. This may be accomplished by hand, although special spinning equipment is far more efficient. Another advantage is that cable life is lengthened by reducing friction at points of support. There is less danger of damage due to expansion and contraction because the wire holds the cable firmly in place.

* * *

STAINLESS steel is said to be ideal for corrosive atmospheres such as railroad crossings and seaboard locations where heavily coated wire often fails within a year or less. Although initial costs are higher than for other wire, stainless steel is more economical because it lasts many times longer. Maintenance costs are much less, too.

* * *

ACCORDING to Engineer D. J. Neale, of the Cable Spinning Equipment Company, Topeka, Kansas, ARMCO Stainless Steel Type 316 has given excellent results on cable suspensions in highly corrosive atmospheres. This grade is especially noted for its high resistance to corrosive conditions.

New Catalog on Insulating Varnishes

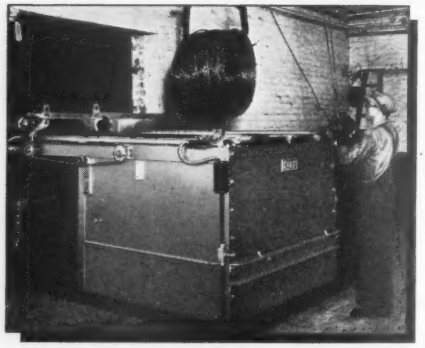
THE Resin and Insulation Materials Division of the **General Electric Company,** Schenectady, 5, N. Y., has published a new 44-page catalog covering its line of insulating varnishes.

* * *

EACH type is described as to specifications, electrical properties, film properties, and other characteristics. A two-page chart summarizes all of the data on each item for convenient and comparative references. Please write to the General Electric Company for your copy.

SPEEDY, SCALE-FREE WIRE ANNEALING

★



Unique Ajax Electric Salt Bath Method provides fast, scale-free production—without decarburization. Cuts operating costs—greatly increases pot-life!

★

Added advantages in this modern, proved annealing method are—less floor space required, less labor, low maintenance cost, shorter time cycles (rarely over 20 minutes), no atmosphere equipment, no scaling, no explosion hazard. This modern electric salt bath annealing by the famous immersed electrode internal heating principle is ideal for annealing low carbon, high carbon and stainless steel wire and rod—in gauges from .020" to .250". Or for annealing aluminum, and copper and silver alloys. Also for descaling stainless and alloy steel wires in molten caustic soda. Recently developed salt mixtures greatly lower the cost of these operations. Interesting case-histories are available. Write for list of users.

AJAX ELECTRIC CO., INC.
FRANKFORD AND DELAWARE AVES., PHILADELPHIA 23, PA.
THE WORLD'S LARGEST MANUFACTURER OF ELECTRIC HEAT TREATING FURNACES EXCLUSIVELY!

THE AJAX ELECTRIC SALT BATH FURNACE
HULTGREN

ASSOCIATE COMPANIES:
Ajax Metal Co.—Ajax Electric Furnace Corp.—Ajax Electrothermic Corp.—Ajax Engineering Corp.

Publishes Manual for Wire Users

AN interesting book entitled "A Manual for Wire Users" has been received from John Rigby and Sons, Ltd., Lancashire, England.

* * *

THIS book is comprised of 108 pages of information on the various wires and wire forms produced by them and a compendium of useful data of interest to wire users.

* * *

THIS latter, occupying 66 pages in the book, gives the various wire gauges with their inch or decimal equivalents, weight, hardness and load tables, conversion tables, a table of melting heats and sundry formulae covering weights, areas and so forth.

* * *

THE company is to be congratulated for having issued so splendid a book, in which their customers will find so much of practical, useable information.

Develop Carbide Wire Straightening Die

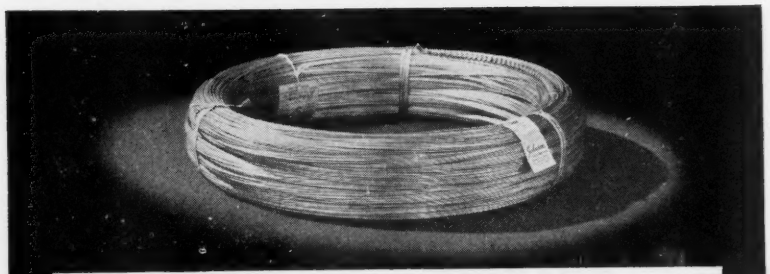
A new tungsten carbide wire straightening die has been developed by the **Adamas Carbide Corporation**, 1819 Broadway, New York 23, N. Y. in response to trouble experienced by a concern who was having what they considered too-high die costs.

* * *

THE new dies are said to have lasted 150 times as long as the old types being used before. The application was to 1/4" to 1/2" diameter hot rolled wire which involved the harsh action of scale on the dies. These dies are made so that they may be used on any standard wire straightening machine, but are only one of many carbide applications developed by Adamas for the wire industry.

* * *

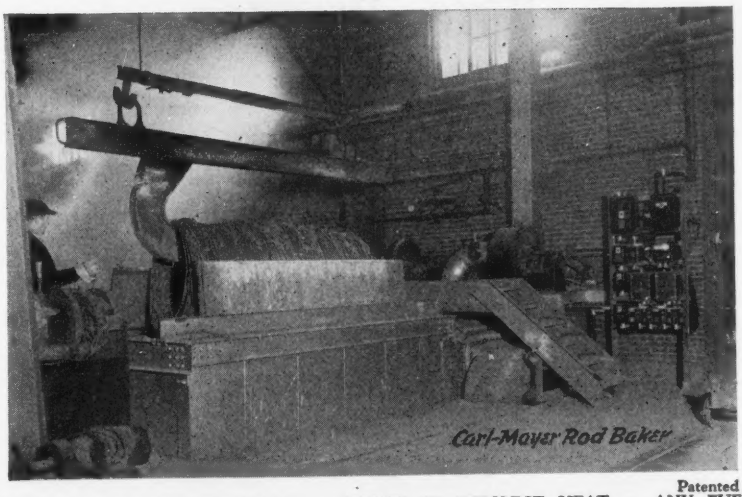
FULL information will be furnished upon request.



Aircraft Wire—tinned or alloy coated and galvanized
Armature Binding Wire—tinned or alloy coated
Belt Hook Wire—tinned, galvanized or alloy coated
Bobby Pin Wire
Brush Wire—round scratch brush, tempered and untempered. High strain white liquor finish
Card Wire—tempered, round, angular, single convex, double convex
Curtain Spring Wire—round, flat
Fish Leader Wire
Flexible Shaft Wire—Music Wire quality
Hard Drawn Spring Wire
Heddle Wire
Hose Reinforcement Wire
Mandolin Wire
Music Wire, bright, tinned or alloy coated
Piano Wire, perfected quality
Rope Wire, bright or galvanized—mild plow, plow, improved plow
Seal Wire
Stainless Steel Wire
Stapling Wire
Stitching Wire
Tire Wire—bronze plated

JOHNSON
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

MORE PRODUCTION
with CARL-MAYER HI-SPEED
ROD BAKERS - OVENS - FURNACES



Patented
TYPICAL HI-SPEED ROD BAKER — DIRECT OR INDIRECT HEAT — ANY FUEL
WRITE for BULLETIN No. 241

Growing interest in our type of equipment is evidenced by Carl-Mayer installations for such plants as:—

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
California Wire Cloth Corp.
Eaton Mfg. Co.
Frost Steel & Wire Co. Ltd.
Hollup Corp.
Johnson & Nephew Ltd.
Jones & Laughlin Steel Corp.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada
Wickwire Spencer Steel Div.
Page Steel & Wire Co.

THE CARL-MAYER CORPORATION
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The first and the finest
GALVANIZING FLUX

No wonder H-VW-M No. 20 Galvanizing Flux—the first patented flux successful in hot galvanizing—is pronounced by so many galvanizers—"finest for the work." Years of experiments, years of study, produced H-VW-M No. 20—a flux "tailor made" to give a superior zinc adherence—a smooth, ductile coating and to reduce dross.

See for yourself what advantages No. 20 offers. For details, drop H-VW-M a line. Or ask for an H-VW-M engineer to call in person. It's likely his knowledge of problems like yours will lower operating costs, improve your product, and give you increased simplicity and control in hot galvanizing.

2465

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MATAWAN, NEW JERSEY
Manufacturers of a complete line of electroplating and polishing equipment and supplies
Plants: Matawan, New Jersey • Anderson, Indiana
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HANSON-VAN WINKLE-MUNNING CO. MATAWAN, NEW JERSEY U.S.A. SINCE 1820

THE CRUM CALCULATOR for Wire Drafting

Provides answers simply and accurately for a given mathematical wire drafting problem. One setting shows number of holes, percentage of draft per hole, total reduction in area and intermediate die sizes to be used. Universality: Because of the circular scale there are neither upper nor lower limits on the diameters that the calculator can be used for.

The Crum calculator is designed especially for wire drawing jobs involving eight or fewer drafts. Problems involving a greater number of drafts can be solved, however, with extra manipulation. For instance, if it is desired to set up a multi-draft machine to draw .0095 inch diameter wire from .0625 inch stock in sixteen drafts, the intermediate die sizes can be determined by the calculator.

HOW TO ORDER

The price is $5.00 each. A discount of 10% on ten or more. Send check or purchase order to

WIRE AND WIRE PRODUCTS
300 MAIN STREET STAMFORD, CONN.

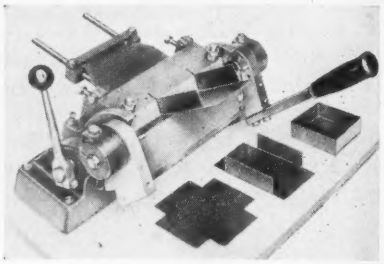
New Duplicating Machine Catalog

A new 40-page DI-ACRO Catalog, No. 46-11 is off the press giving complete information covering the completely redesigned DI-ACRO Brakes.

* * *

A great deal of new material illustrating many "Die-Less Duplicating" applications in various industries is contained in this latest edition of the DI-ACRO Catalog.

* * *



Die-Less Duplicating

MANY recent improvements incorporated in DI-ACRO Precision Machines, which have greatly increased their wide working range, are illustrated for the first time in this booklet.

* * *

FOR many years, DI-ACRO Brakes have proven extremely valuable to numerous firms throughout the country in model shops, experimental laboratories and production departments, replacing dies for both simple and complicated forming operations.

* * *

AS a result of years of experimental and development work, a vastly superior style of DI-ACRO Brake has been perfected which is just now being offered on the market and we wish to call your attention to Pages 20 and 21 of our catalog for detailed information covering our redesigned models.

* * *

DI-ACRO Brakes are offered in four sizes; 6", 12", 18" and 24". All models have a material capacity of 16 gauge cold rolled sheet steel and for illustrations

and specifications of each unit, we refer you to pages 24 to 27.

* * *

ONE of the valuable features incorporated in all DI-ACRO Brakes is the provision made to easily convert the unit for duplicating unusual shapes and complicated parts on a production basis. This is illustrated on page 22 where two special forming operations are shown.

* * *

A copy of this catalog may be sceured by writing the **O'Neil-Irwin Manufacturing Company,** 303 Eighth Ave., Lake City, Minn.

Issues Booklet on Saturants

A 16-page booklet describing their ZYROX saturants for treating fibrous materials used in the manufacture of electric wire and cable has been published by the **Bakelite Corporation,** 300 Madison Avenue, New York, 17, N. Y.

* * *

THE booklet gives data on the properties and compound evaluation of these saturants and describes their principal applications to wire and cable, where cotton, asbestos and other types of insulating materials are used and are said to provide moisture and flame retardant characteristics, as well as good dielectric qualities.

* * *

COPIES are available to our readers by writing the Bakelite Corporation.

TO WIRE MILL MEN

Have you considered joining the Wire Association? You are cordially invited to become a member. Dues are $15.00 a year, which includes a subscription to WIRE & WIRE PRODUCTS and a copy of the Annual Buyers Guide.

THE WIRE ASSOCIATION

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Wire Drawing Dies — Tubing Dies — Coating Dies — Sizing Dies —Ring Gauges — Cut-off Quills. Also Manufacturers of Diamond Dies & Diamond Powder.

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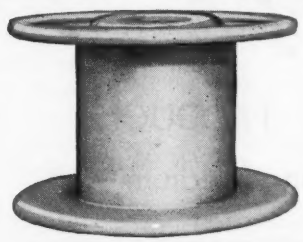

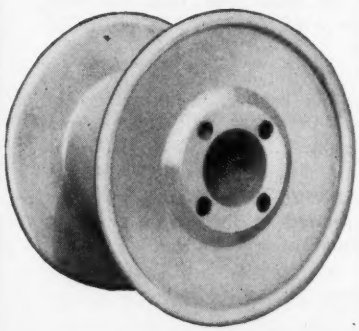

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STEEL REELS

The reels that are engineered to the job... designed and built by the company that originated the steel reel idea . . . are the reels you should be using in your plant. Every year, more and more Apco Mossberg Steel Reels are bought by quality-minded buyers throughout the wire industry.

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ENGINEERING SERVICE

Without obligation to you, Apco Mossberg engineers will be glad to study your reel problem, and supply complete suggestions, drawings, blue prints. Write for information today.

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APCO MOSSBERG COMPANY

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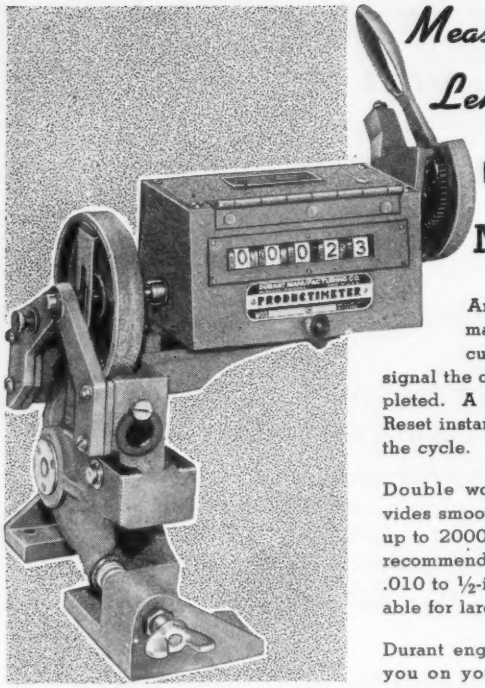
21 LAMB ST., . . . ATTLEBORO, MASS.



Measure Predetermined Lengths of Wire on

PRODUCTIMETER

Model L-R-16-Q

An electric switch inside the counter may be wired to close or open a circuit, ring a bell, or turn on a light to signal the operator when the preset run is completed. A single stroke on the Quick Lever Reset instantly resets the counter for repeating the cycle.

Double worm drive reduction gearing provides smooth, continuous operation of counter up to 2000 feet per minute. Model L-R-16-Q recommended for bare or covered wire from .010 to ½-inch diameter . . . other units available for larger diameters.

Durant engineers are at your service to help you on your specific counting problems.

Write today for Bulletin No. 40

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Edmund D. Sickels, Advertising Manager

WIRE and WIRE PRODUCTS

300 MAIN STREET ● STAMFORD, CONN.

New Hand Truck Offered by Yale & Towne

INDUSTRY acceptance, during the past year, of the so-called "work-saver" type of powered hand truck (which uses electrical power to lift the load as well as to propel the truck, while the operator merely "strolls and steers") has brought about a new variation (illustrated)

which permits the load to be lifted to considerable heights from the floor for purposes of stacking and picking up from elevated docks, racks or tailgates. The new piece of equipment is known as the Yale High-Lift Platform Model Work-saver and fills a need for equipment mid-way between the simple hand truck and the complete heavy duty highlift platform truck.

* * *

TWO models are available: one with a platform which can get under a 7″ skid and hoist it to a height of 66½″; the other with a platform which can get under a 11″ skid and lift it to a height of 70½″. Both models have lifting capacity of 4,000 lbs. The 11″ model has 10″ diameter wheels under the load as well as at the drive end, for working over rougher floor and yard surfaces. The units are highly maneuverable and can turn a right angle within 91″, need only 54″ aisles, and can swing within a circle of 95″ radius. They can climb at 9% grade with load.

* * *

LITERATURE and specifications may be obtained through The **Yale & Towne Mfg. Co.**, 4530 Tacony Street, Philadelphia 24, Pa.

● Abrasion, gouges and other scars of long useful service do not affect HAVEG'S high resistance to a long list of corrosive agents.

Tanks, towers, and other large, structurally strong equipment can be molded in one piece at nominal cost. And because the Haveg process is extremely adaptable, many complicated and non-standard items offer minimum manufacturing difficulties with a consequent saving in your investment.

Haveg Bulletin F-4 gives complete information on corrosion resistance, physical properties, structural details and other engineering data. Send for it today.

HAVEG
CORPORATION
NEWARK 47, DELAWARE

CLEVELAND CHICAGO DETROIT LOS ANGELES

Crucible Steel Company to Expand and Improve Facilities

IN its annual report to stockholders, the **Crucible Steel Company** outlines a two year expansion program under which they will spend $30,000,000 for the building of a number of new plants and the modernization of existing plants. Plans call for a new metallurgical laboratory and office building in Pittsburgh and the re-equipping and rehabilitation of their Spring Works, also in Pittsburgh. About $3,300,000 will be spent for a new laboratory and increased production at the Syracuse Halcomb Works. The Jersey City plant will be moved to Harrison, N. J. Their biggest plant, the Midland Works, will get the largest portion of the appropriation, which includes facilities for producing bars and billets. The object of the program is twofold to increase production and to provide operating economies.

Philips Technical Review Features Article on Copper Wire

THE most recent issue (Volume 8, Number 10) of Philips Technical Review contains the following article according to an announcement by **Philips Laboratories, Inc.**, Irvington, N. Y., an affiliate: Non-Ferrous Copper Wire for Moving-Coil Meters by F. G. Moorel and A. Rademakers.

* * *

IN this article is described how the material from which the moving system of moving-coil meters is made may contain particles of iron. The ferromagnetism of these particles, combined with the accidental or intended inhomogeneity of the magnetic field, causes certain defects in the measuring instrument, such as non-reproducible zero point or, in the case of voltameter, an excessive residual couple. In this article means are discussed for keeping, in particular, the copper wire used for a moving coil as free of iron as possible in the manufacturing process and especially while it is being drawn. Some of the results achieved in this manner are mentioned. If the complete article is of interest, readers may send for it.

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DIE ROOM
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WIRE DIE FINISHING
MACHINERY

WE MAKE
MODERN
AUTOMATIC MACHINERY
TO INCREASE THE
EFFICIENCY AND
PRODUCTION OF
TUNGSTEN CARBIDE
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DIES

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AUTOMATIC POLISHERS

● *NEW* ROOS
PIN MAKER

● *NEW* ROOS
PREMIUM PIN GRINDER

and

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POLISHERS, DRILLERS
TO SPEED UP
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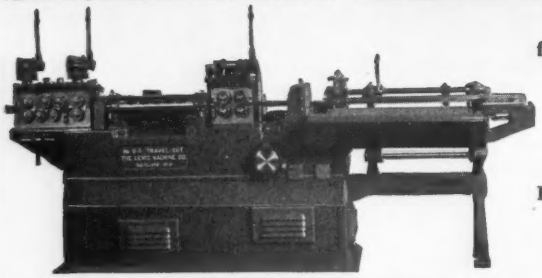

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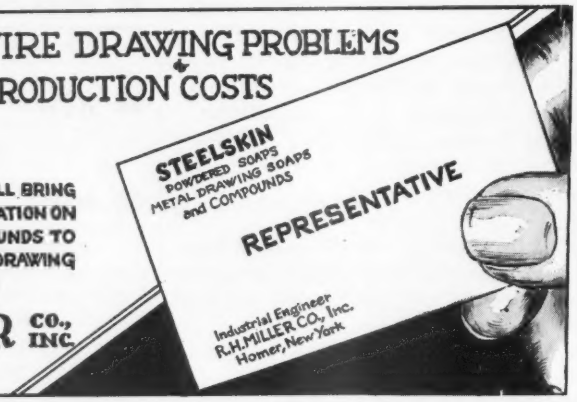

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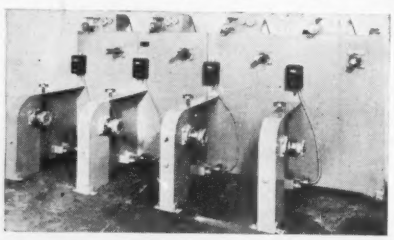

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Pennsylvania, U. S. A.

New Screw-Drum Washer and Dryer Announced by Optimus, Washes, Rinses, Dries

A new screw-drum type machine has just been announced by **Optimus Equipment Company**, 251 Church Street, Matawan, N. J., manufacturers of metal washing machines and dryers, can be used for washing and drying metal parts, rinsing and drying them, or any part of these operations.

* * *

THE new machine can also be adapted for a wash-drain, rinse-drain- cold or hot air dry sequence, or for pickling operations. It is particularly designed to handle difficult rinsing and drying jobs involving screw machine or small stamped parts.

* * *

THE dryer end is completely closed to avoid air loss. The air stream passes through a heater and blower which provides for either hot or cold air blast system.

* * *

ALL parts of the machine are readily accessible for lubrication, maintenance or alterations. Centralized lubrication may be provided.

* * *

New Norbide Folder

THE **Norton Company**, Worcester, Mass., has published a new folder describing and illustrating the use of Norbide (boron carbide) powders for ripping, semi-finishing and lapping cemented carbide wire drawing dies. A price list is included.

* * *

THE company has also published a new booklet covering its heavy duty refractories, which besides describing the various refractories, includes a number of informative tables covering properties, thermal expansion, conductivity, temperature conversion and melting points of various metals.

* * *

EITHER or both of these may be secured by writing the company.

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Surface Treatment for Aluminum

A new surface treatment for aluminum providing high corrosion resistance and a lasting bond for Organic Finishes is now being put on the market by the **American Chemical Paint Co.**, of Ambler, Pa., under the trade name **ALODINE.**

* * *

AN interesting folder describing the process and treatment of aluminum by this process may be obtained by writing the company at the address given above.

Henry L. Randall, Metal Co. Head, Passes.

HENRY LeRoy Randall, President of the Riverside Metal Company, died at the Zurbrugg Memorial Hospital, Riverside, New Jersey, February 18th.

* * *

MR. Randall, a native of New Milford, Connecticut, was born in 1891 and educated at the New Milford High School. Phillips Academy, Andover, Massachusetts, and Yale University, Sheffield Scientific School. His first position was with the American Brass Company and until 1916 worked in different capacities for the Torrington & Kenosha Branches.

* * *

IN 1916, he came to The Riverside Metal Company as Assistant Works Manager in which capacity he served until 1918 when he became Works Manager. He became President of The Riverside Metal Company in November of 1920 and held that position until 1942 when by merger of The Riverside Metal Company and the Keystone Watch Case Corporation, he became President of both concerns.

* * *

AMONG the societies of which Mr. Randall was a member are the American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers. The Wire Association and British Institute of Metals. He was also a Director of The Riverside Metal Company and the Cinnaminson Bank and Trust Company of Riverton, and was very active in

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Cortland BRANDS

the Copper and Brass Research Association. During the War, Mr. Randall served as a member of the Brass Mill Advisory Committee of the War Production Board whose policies were responsible for the operation of the entire industry, of which The Riverside Metal Company is a member.

* * *

A. G. Melcher Taken by Death

A. G. **Melcher**, General Superintendent of the **Hoskins Manufacturing Company**, Detroit, Michigan, manufacturers of resistance wire and other heat resisting metals, died suddenly on February 13, 1947. Mr. Melcher had been a member of the Wire Association for many years and his passing is noted with regret.

* * *

Catalog Covers Material Handling Equipment

A new catalog, Pocket Edition, number 4, combining a series of material handling bulletins under one cover, has been issued by the **Cleveland-Tramrail Division** of the **Cleveland Crane and Engineering Co.**, Wickliffe, Ohio.

* * *

A section is devoted to various types of equipment especially adopted to rod and wire handling, but the book is virtually a handbook of information that will be useful in solving practically any material handling problem.

* * *

Management and Post War Labor Problems as Seen in Britain

(*Continued from page* 294)

energetic steps are taken without fear or favour to penalize either the management that ignores its pledge or any section of the labouring community (as it has done in the past) who ceases work with-

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out the approval of its recognized leaders or without pressing its dispute through the normal accepted channels. There is no doubt that in the past, the selection of most unpleasant strikes the country has experienced (and paid for) has been due to the vaccilation of the Government and Management bodies who have omitted to take the strong steps that such situations demand. Any form of demand coupled with a threat to cease work must for the very safety of the country be dealt with in precisely the same manner as an emergency was dealt with by the country during the last six years of war.

* * *

WHETHER wages and rates of pay as a whole are standardized, or reduced, or raised, is not by itself of very great importance. A further increase in wages will automatically result in an increase in the price of all commodities. The net result to the wage earner will be negligible. On the other hand wage rates cannot be reduced, unless prior to this, steps are taken to either peg or reduce by one means or another prices of basic commodities and services. It would appear from trends that for the next two or three years whilst the present immediate demand from export customers persists that wages will remain fairly static at the end of this period providing our production results have been as good as anticipated there is no reason why wages should not be maintained at the present level and at the same time people benefit by a drop in present commodity prices. By this means an improvement in the cost of living is a certainty. The main factor to be borne in mind in this connection is that for wages paid there must be a sound commonsense production effort.

* * *

THE Socialist plea tor a forty hour week or less is effective, sound and correct in every way, but it is based upon the premise that in that forty hour week, production will be maintained on a high level from every economic point of view. If a man can produce as much in a forty hour week as he at present does in a sixty hour week there cannot be very good reasons why he should work the greater number of hours instead of receiving by way of bonus wages for the twenty hours he has not worked in time, but only in effort.

* * *

THE National Security Plan drawn up by Sir William Beveridge was also based on the assumption that reduced hours of work will not mean a drop of production but rather that a greater effort will be put into the lower number of hours worked. A reduction in the number of working hours is surely also a greater safeguard against a possible future rise in unemployment.

* * *

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Tel. Col. 5-1340

Sectional Rope Units

(*Continued from page* 285)

THOUGH the tungsten carbide die is gradually being improved to finish this particular design of section, bulk of material is "roughed" through steel draw plates, these lending themselves more readily to the easy alteration of entrance orifice, often necessary due to variation in shape of rod.

* * *

A new design of sectional unit, employed in construction of special guide and aerial ropes, is so fabricated as to form, when locked, a tubular construction. In guide production these ropes consist of one layer of sectional units only, and two layers for aerial ropes.

* * *

IN guide form these ropes are 16% lighter than 7 Rod guides of equal diameter, and 25% lighter

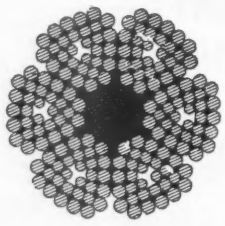

Fig. 7.

than locked coil. Aerial constructions furnish greater resilence than spiral or locking types, and saving in weight permits installation of larger diameter constructions, thus increasing arc of contact with carrier wheels. Design of section permits wear to greater depth than locked-coil construction without impairing efficiency.

* * *

THOUGH not locking construction, cross section No. 7, illustrating a flattened strand mining rope may be of interest to section unit producers as including a core wire of un-common shape. As will be noted core wire in each strand is roughly

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triangular, with the three edges drawn off and grooved to support contacting round unit.

* * *

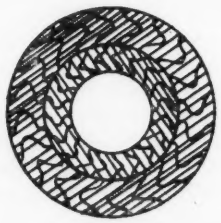

Fig. 8.

NO. 8. Type of single draft block or drum as employed in sectional unit drawing.

Chemical Technical Dictionary

AN entirely new dictionary of the above title has just been published by the **Chemical Publishing Co.**, 26 Court Street, Brooklyn, 2, N. Y. It is edited by H. Bennett, Technical Director of Glyco Products Co., Inc. and contains 1120 pages with 50,000 terms and definitions. It is 6 x 9 in size and sells for $10.00.

* * *

THE dictionary covers the chemical, metallurgical, plastic, industrial, mathematical, electrical, engineering and several other fields; it also includes a directory of trade name products. Important and useful tables are included for completeness.

* * *

THIS is probably the most complete work of its kind that has appeared to date and will be found of value to metallurgists, chemists, sales executives, research men and a lot of others having to do with industrial problems, and should be a part of every library.

* * *

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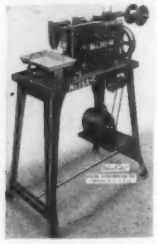

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Manufacture of High Frequency Cables

(*Continued from page 279*)

second conductor is braided on the insulated cable. (Figure 4). Finally a jacketing material is extruded on the cable.

* * *

IN order to achieve the maximum accuracy in extrusion, Federal Telephone and Radio has designed and installed a special "electronic-control" system for each extruder, whereby the extruder operator can adjust and control each individual section of the overall extruder set-up from a master panel. All the motors are controlled by a time-delay switch which ensures that no load is put on the motors until they have had an interval of time in which to warm up and stabilize. Where the motors might be sub-

Fig. 5 — Checking the diameter of high frequency cable after the extrusion of the jacketing material.

* * *

ject to overload should trouble develop, such as the failure of the oil system on the extruder head, with consequent freezing of the plastic and resistance to rotation of the screw, the motor is provided with a torque control which eliminates the danger of damaged machinery and burnt out motors.

* * *

THE rotation of the screw itself is governed by a special circuit which keeps the rotation at a constant rate despite any variations that might occur elsewhere in the system; similarly the capstan is

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Besides being profusely illustrated, there are many reference tables providing much useful data. An effort has been made to treat every phase of the subject in a practical and helpful manner. If you are making diamond dies or tools, or using them, you cannot afford to be without this book.
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* * *

A review of the manufacture of high frequency cables reveals that great progress has been made in the utilization of new materials and equipments. However, this progress has not stopped; the outlook for synthetic-insulated cables is tremendous.

* * *

AT the present time, our Dielectric Laboratories have produced dielectric compounds with characteristics considerably improved with respect to materials used during the war.

* * *

NEW and unusual cable types will be produced; among these, delay lines, high impedance cables, low capacitance cables, highly balanced transmission lines, and cables capable of extremely high temperature operation. Considerable progress has already been made in this direction; for examples, Federal's 950 ohm delay line and the highly balanced KT-51 dual transmission line.

* * *

THE success that has already been achieved by the cable manufacturers in conjunction with equipment designers and engineers, proves that high frequency cable development will be prepared to meet the requirements of the rapidly expanding fields of electronics.

FOR SALE — One national one inch Semi-Hot HEADER automatic feed, will exchange for 2½ inch forging machine hand feed preferably "national" made. Address Box No. 463, WIRE & WIRE PRODUCTS.

PLANT SUPERINTENDENT WANTED
With experiencie in Electrical wire manufacturing. Must be well versed in all phases of production, including technical knowledge of thermoplastic extrusion and compounding. Should be a basic wire man who has occupied similar position elsewhere. Will consider general manager who has proper factory experience. Plant located outside Metropolitan Area New York City. Salary commensurate with position. Write WIRE & Wire PROUCTS, Box 461.

WANTED TO BUY
plant or facilities to manufacture 18 - 20 gauge wire.
Box No. 444
WIRE & WIRE PRODUCTS

FOR SALE
One Morgan-Connor 6 Hole Continuous Wire drawing block, in perfect condition. 40 H. P. AC Motor 440 V — 3 PH — 60 Cy. Reduction gear, stripper, and strand for drawing #5 Wire Rods. Box No. 460, WIRE & WIRE PRODUCTS.

MAN WANTED
A company engaged in the manufacture of springs for seat cushions desires to hire a man to do development work on special production machines.
The situation calls for a man with an inventive and creative mind who can furnish evidence of definite accomplishment in the design of new types of wire forming machinery. Reply in detail giving age, experience and education.
Reply Box No 462.
WIRE & WIRE PRODUCTS

WANTED
Automatic Wire & Rod Straightening and Cutting off Machine for sizes 3/8" to 11/16" dia. up to j4'0" long, motorized machines only.
Coiled wire & Rod Drawing Machines for Single & Multiple hole drawing for sizes up to 5/8" dia.
REYNOLDS METALS CO.
2500 S. 3rd St.,
Louisville, Ky.,
J. A. Black. Phone Ma-4760

WIRE WORKING MACHINERY
National Automatic Wire Nail Machines
1 Torrington Tandem Rolling Mill M.D.
2 Torrington No. W-24 Spring Coilers M.D.
2 Waterbury Step Cone Drawing Machines.
3 Nilson 4-slide Wire Forming Machines.
2 Shuster Shaped Wire S & C Machines.
8 Shuster Round Wire S & C Machines.
NATIONAL MACHINERY EXCHANGE
128-138 MOTT ST. NEW YORK, N. Y.

Index To Advertisers

A

Ajax Electric Co., Inc. 306
Ajax Industrial Supplies, Inc. 316
Aluminum Company of America 269
American Chemical Paint Co. 305
American Insulating Machinery Company 312
American Rolling Mill Co., The Rustless Iron & Steel Div. 264
American Steel & Wire Co. 251
Apco Mossberg Company 309
Apex Alkali Products Co. 259

B

Balloffet Dies & Nozzle Co., Inc. 313
Bethlehem Steel Co. 250
Boyd, Charles P., Corp. 315
Bridge Mfg. Co., The 317

C

Carboloy Company, The 286-287
Carl-Mayer Corp., The 307
Ceilcote Co., The 313
Champion Diamond Co., Inc. 316
Cleveland Tramrail Division of the Cleveland Crane & Engineering Co. 318
Cochaud Wire Die Corporation 316
Columbia Steel Co. 251
Continental Steel Corporation 312
Crepe-Kraft Co., The 318

D

Davis, R. L. Electric Co. 258
Durant Mfg. Co. 310

E

Eastern Tungsten Carbide Co. 314
Eisler Engineering Co. 318
Electric Furnace Company ..... Back Cover
Emory, Robert J. Company 319
Entwistle, James L., Co. 271

F

Firth-Sterling Steel Company 276
Fort Wayne Wire Die, Inc. 316
Furnace Engineers, Inc. 318

G

General Electric Company 262
Glader, Wm. Machine Works 298

H

Hanson-Van Winkle-Munning Co. 308
Haveg Corporation 311
Hayward, R. B., Co. 318
Howsam Spool Co. 318
Hubbard Spool Company 270
Hudson Wire Co. 256
Hughesville Machine & Tool Company 318

I

Indiana Wire Die Company 316
Industrial Ovens, Inc. 318
International Nickel Co., Inc. 260

J

Johnson Steel & Wire Co., Inc. 307
Jones & Laughlin Steel Corp. 283

K

Keagler Brick Company 317
Kelly Wire Die Corporation 316
Keystone Steel & Wire Co. 297

L

Lancaster Allwine & Rommel 319
Lewis, K. B. 319
Lewis, Machine Co., The 312

M

Magnus Chemical Company 266
Malin & Company, The 317
Metal Carbides Corporation 253
Michigan Wire Die Co. 309
Micro Products Company 295
Millbury Die Co. 315
Miller, R. H. Company, Inc. 312
Morgan Construction Company 274
Mossberg Pressed Steel Corp. 302

N

National Annealing Box Co. 319
National Machinery Exchange 319
New England Butt Co. 265
New England Wire Die Co. 316
Niles Steel Products Div., Republic Steel Corp. 275
Norton Company, The 267
North American Philips Co., Inc. 318

O

Oakite Products, Inc. 313
O'Neil-Irwin Mfg. Co. 317
Owens-Corning Fiberglas Corp. 272

P

Parkin Wm. M. Co. 317
Platt Brothers & Co., The 317
Porter, H. K., Inc. 313
Potter, Neil C. 317

R

Reed and Richards Transatlantic, Inc. 299
Reynolds Wire Company 268
Robertson, John Co., Inc. 263
Roebling's, John A., Sons Company 280-281
Roos, H. &G., Tool & Mfg. Co. 311
Ross, J. O., Enginering Co. 317
Royle, John & Sons 300
Ruesch, H. J., Machine Co. 317
Rusch Wire Die Corporation 316
Rustless Iron & Steel Div., American Rolling Mill Co. 264

S

Sauereisen Cements Co. 317
Scott Testers, Inc. 317
Scudder, E. J. Foundry & Machine Co. 317
Seifert, E. R., Inc. 318
Shuster, F. B., Mfg. Co., The 296
Sleeper & Hartley, Inc. 316
Standard Industrial Compounds Co. 261
Standard Varnish Works 254
Surface Combustion Corp. 316
Syer, Raymond C. 319
Syncro Machine Company 252

T

Tennessee Coal, Iron & R. R. Co. 251
Torrington Manufacturing Co. 316
Trauwood Engineering Co., The 317
Tungsten Alloy Mfg. Company 316

U

Union Wire Die Corp. 303
U. S. Steel Export Co. 251

V

Van Itallie Corp. 316
Vascoloy-Ramet Corp. 257
Vaughn Machinery Co. ..... Front Cover
Vianney Wire Die Works 314

W

Warner Company 314
Waterbury-Farrel Foundry and Machine Co. 249
Watson Machine Company ..... Inside Back Cover
Wayne Wire Die Co. 316
Wean Equipment Corp. 301
Wickwire Bros., Inc. 314
Wilson, Lee, Engineering Co., The ..... Inside Front Cover
Wire & Textile Machinery, Inc. 315

Y

Youngstown Sheet & Tube Company 255

WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Directory, Index & Buyers' Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

ACID INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

ACID-PROOF CONSTRUCTION—
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.
Sauereisen Cements Co., Pittsburgh, Pa.

AIR DRAW FURNACES
Carl-Mayer Corp., Cleveland, Ohio.

ALKALINE CLEANERS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

ANNEALING MACHINES—Open Flame
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
National Annealing Box Co., Washington, Penna.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J

ARMORING EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ross, J. O. Engr. Corp., New York, N. Y.

BAR STOCK—Stainless Steel
American Rolling Mill Co., The, Middletown, Conn.
Rustless Iron & Steel Div., The American Rolling Mill Co., Baltimore, Md.

BENDERS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BOBBINS—Braider & Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

BORON CARBIDE
Norton Co., Worcester. Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Pawtucket, R. I.

BRAKES & SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn..

BRICKS—Acid Proof
Keagler Brick Co., Steubenville, Ohio.

CABLE LACQUERING OVENS
Industrial Ovens, Inc., Cleveland, O.

CABLE—Steel and Copper
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.

CEMENTS—Acid Proof
Sauereisen Cements Co., Pittsburgh, Pa.
Ceilcote Co., The, Cleveland, Ohio.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANERS—Hand and Metal
American Chemical Paint Co., Ambler, Pa.
Magnus Chemical Co., Garwood, N. J.
Apex Alkali Products Co., Phila, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland. Ohio.
Wilson, Lee, Engr. Co., Cleveland. Ohio.

CLOTH TESTERS—
Scott Testers, Inc., Providence, R. I.

CLOTH—WIRE. All Metals
Reynolds Wire Co., Dixon, Ill.
Roebling's John A. Sons, Co., Trenton, N. J.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J. Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

COLD HEADERS—
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds, Co., Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago. Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Champion Diamond Co., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Van Itallie Co., The, New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Champion Diamond Co., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Union Wire Die Corp., New York, N. Y.
Van Itallie Co., The, New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND TOOLS—
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Lead Extrusion
Eastern Tungsten Carbide Co., Newark, N. J.
Robertson, John, Co., Brooklyn, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
New Eng. Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Union Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Tungsten Carbide Co., Newark, N. J
Firth Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Works, Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc. Guttenburg N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Millbury Die Co., Millbury, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenburg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
Millbury Die Co., Millbury, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Tungsten Alloy Mfg. Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIRECT ELECTRIC RESISTANCE HEATING—
Trauwood Engineering Co., The, Cleveland Ohio.

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

DRYING & PRE-HEATING ROOMS—
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O. Engr. Corp., New York, N. Y.

ENGINEERS—Consulting Wire Mill
Lewis, Kenneth B., Worcester, Mass
Syer, C. Raymond, Westport, Conn.

EQUIPMENT—Insulation Testing
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I

EYELETS—Brass or Zinc
Platt Bros., & Co., The, Waterbury, Conn.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M. Co., Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Ovens, Inc., Cleveland, Ohio.

FURNACES—Annealing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engrs. Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland Ohio.
Wilson, Lee, Engr. Co., Cleveland. Ohio.

WHERE TO BUY, Continued

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Co., Inc., Philadelphia, Pa.

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corporation, Toledo, O.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corporation, Toledo, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING EQUIPMENT—
Hanson Van Wrinkle, Munning Co., Matawan, N.J.

GALVANIZING KETTLES—
National Annealing Box Co., Washington, Penna.

GRINDERS—Roll
Norton Co., Worcester, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of Cleveland.
Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
Industrial Ovens, Inc., Cleveland, Ohio.

INSULATING MATERIALS—
General Electric Co., Schenectady, N. Y.
Owens-Corning Fiberglas Corp., Toledo, Ohio.
Standard Varnish Wks., Staten Island, N. Y.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

LIME—
Warner & Co., Philadelphia and Bellefonte, Pa.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bale Tie
Reed and Richards Transatlantic, Inc., New York, N. Y.

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Brazing
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Entwistle, Jas. L. Co., Pawtucket, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Coilers
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J. Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Copper Wire Drawing and Rolling
American Insulating Mach'y Co., Phila, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila, Pa.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch., (Used), New York, N.Y.
Porter, H. K. Inc., Everett, Mass.
Shuster, F. B. Mfg., Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Die Making
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co. Montclair, N.J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Edging
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, O.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Extruding
Robertson John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.

MACHINERY—Fence
Glader, Wm. Machine Works, Chicago, Ill.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Forming
Eisler Engineering Co., Newark, N. J.
National Mach'y Exch. (Used), New York, N. Y.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Reed and Richard Transatlantic, Inc., New York, N. Y.
Seifert, E. R., Inc., Syracuse, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Pawtucket, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co, Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Material Handling
Cleveland Tramrail, Div. of the Cleveland.
Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm. Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.

WHERE TO BUY, Continued

MACHINERY—Pointing
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rubber for Insulating Wire
Royle, John & Sons, Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Screw Wire
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila, Pa.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Boyd, Charles P., Corp., Philadelphia, Pa.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N .J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Staple
Reed and Richards Transatlantic, Inc., New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Stranding
Huhgesville Machine & Tool Co., Hughesville, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Swaging
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N .J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N .J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing Equipment—Sparkers
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Industrial Ovens, Inc., Cleveland, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
American Insulating Mach'y Co., Phila, Pa.
Eisler Engineering Co., Newark, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J .

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Torrington Mfg. Co., Torrington, Conn.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Dehydrogenizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O. Engr. Corp., N. Y., N. Y.

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER—For Coil Wrapping and Corrosion Prevention
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott Testers, Inc., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D.C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.

PIPES & FITTINGS—Acid Resistant
Ceilcote, Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio.

POTS—Lead Melting
National Annealing Box Co, Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co,. Phila, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REELS—Annealing and Stranding
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Co., Aurora, Ill.

REEL AND TENSION STAND—
Industrial Ovens, Inc., Cleveland, Ohio.
Sleeper & Hartley, Inc, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Collapsible
Entwistle, Jas. L. Co., Pawtucket, R. I.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

WHERE TO BUY, Continued

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Bridge Manufacturing Co., Hazardville, Conn.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Vulcanizing & Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div. Republic Steel Corp., Niles, Ohio.

REELS—Wooden
Bridge Mfg., Hazardville, Conn.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.

RODS—Nickel Alloy
International Nickel Co , Inc., New York, N. Y.

RODS—Stainless Steel
American Rolling Mill Co., The, Middletown, Conn.
Rustless Iron & Steel Div., American Rolling Mill Co., The, Baltimore, Md.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

SATURATION SYSTEMS
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Ovens, Inc., Cleveland, Ohio.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company,. Chicago, Ill
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

STAMPINGS—Steel
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.

TANK—Compound
Haveg Corporation, Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.
Sanereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Penna.

TOOLS—Wire Cutting
Porter H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe. O.

TRAVERSES—For Reels
Entwistle, James L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

TREADS—Safety
Norton Co, Worcester, Mass.

TUBE BENDERS AND FORMERS—
Ruesch, H. J. Machine Co., Newark, N. J.

VALVES & FITTINGS—Acid Resistant
Haveg Corporation, Newark, Del.

VARNISHES—For Insulation
Standard Varnish Wks., Staten Island, N. Y.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y Co., Phila, Pa.
Entwistle, James L. Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, O.
Watson Machine Co., Paterson, N. J.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa.
Malin & Co., Cleveland, Ohio.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Rolling Mill Co., The, Middletown, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Enameled for Coils
North American Philips Corp., New York, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland-Chicago-New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Firth Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Reynolds Wire Co., Dixon, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio.

WIRE—Nickel & Nickel Alloy
International Nickel Co., Inc., New York, N. Y.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Non-Ferrous to Specification for Special Purposes
Hudson Wire Co., Ossining, N. Y.
Winsted Div. of Hudson Wire Co., Winsted Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland-Chicago-New York.
Firth-Sterling Steel Co., McKeesport, Pa.
Rustless Iron and Steel Div., American Rolling Mill Co., Baltimore, Md.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling's John A., Sons Co., Trenton, N. J.
Reynolds Wire Co., Dixon, Ill.

WIRE TESTERS—
Scott Testers, Inc., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Reynolds Wire Co., Dixon, Ill.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY
ESTABLISHED 1845
PATERSON 3, NEW JERSEY, U. S. A.

Wire and Wire Products

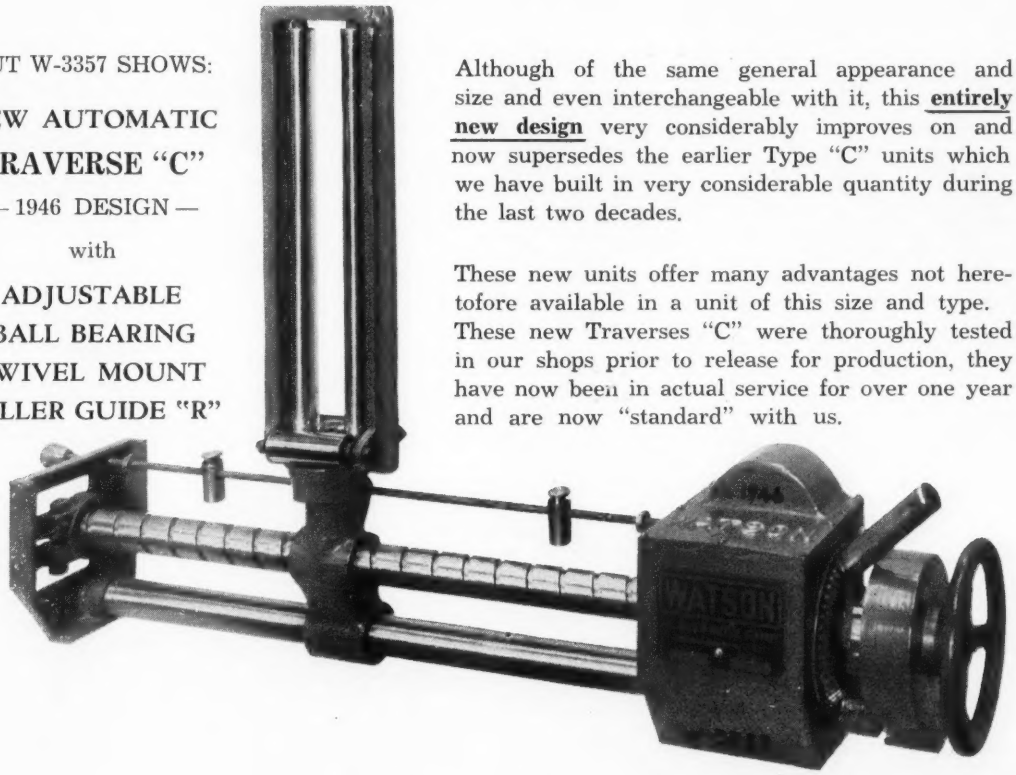
April, 1947.

ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY

AUTOMATIC TRAVERSES — TYPE "C"

CUT W-3357 SHOWS:

NEW AUTOMATIC
TRAVERSE "C"
— 1946 DESIGN —
with
ADJUSTABLE
BALL BEARING
SWIVEL MOUNT
ROLLER GUIDE "R"



Although of the same general appearance and size and even interchangeable with it, this **entirely new design** very considerably improves on and now supersedes the earlier Type "C" units which we have built in very considerable quantity during the last two decades.

These new units offer many advantages not heretofore available in a unit of this size and type. These new Traverses "C" were thoroughly tested in our shops prior to release for production, they have now been in actual service for over one year and are now "standard" with us.

ADVANTAGES.

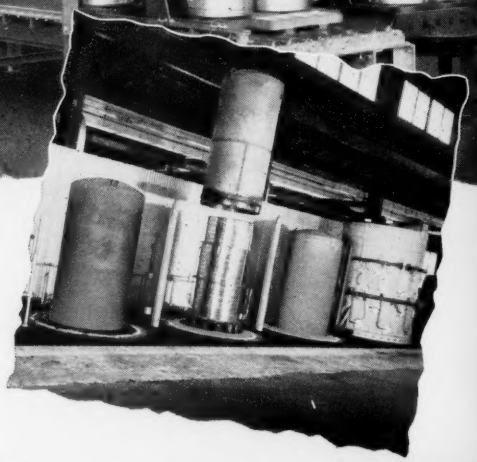
Positive mechanism. No end-point hesitation Fully enclosed reversing drive. All cut gearing and clutches. Instantly adjustable to all Lay, Length and Guide settings. No jamming possible. Mounts on three sides, "Right" or "Left Hand" assemblies. 20:1 Lay Range. Tool steel clutch facings. Cannot be damaged by accidental drive reversal. Roller or Sheave Guides. "Inboard" or "Outboard" driving points. Rugged construction. All adjustments can be effected with the same case and rapidity at "standstill" or in full "operation".

APPLICATIONS.

Supplied as "standard" equipment on all our Takeups of up to 60″ Size. Used in the Gang-Traverse drive of all our larger Gang Spoolers. Widely used on takeups and spoolers of early design or on equipment of other make where the performance of the original traversing mechanism is inadequate. This traversing mechanism is also much in demand wherever a rugged and reliable adjustable reciprocating linear motion is required.

NOTE: Traverse "C" units are arranged to meet any conceivable user requirements as to length lays, driving point and means, guide type and size, etc.

Prospective users request Machine Bul. 110146. Other automatic traverses for heavier or lighter duty applications are also available.

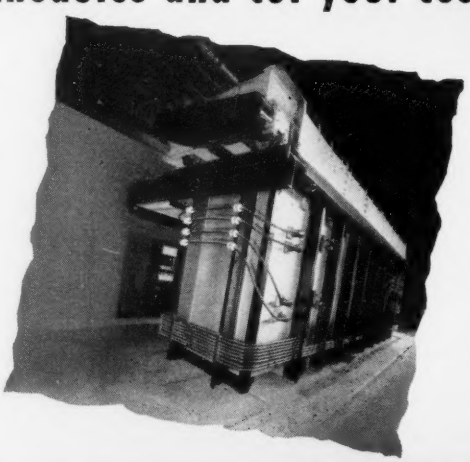


GAS FIRED, OIL FIRED and ELECTRIC FURNACES

will maintain your production schedules and cut your costs

● They are available in sizes to meet any capacity requirement and thus fit into and become an integral part of your production just like any other machine. Each installation is designed and built specially for the particular and individual requirement assuring smooth and continuous flow of material avoiding bottlenecks and delays.

Investigate the EF line—recognized for 30 years for efficiency and economy in heat treating ferrous and non-ferrous cast, forged, drawn, formed, headed, stamped and welded parts,—and get the advantage of the many exclusive EF features that assure uniform temperature throughout the furnace, more accurate heat control within the required limits, reduced maintenance, increased outputs, and uniform low cost, dependable operation.



THE ELECTRIC FURNACE CO.

WILSON ST. AT PENNA. R.R.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem-Ohio